TITLE: MOSAIC INFECTIOUS BURSAL
DISEASE VIRUS VACCINES
Inventor: Boot et al.
Serial No.: 10/046,671
Docket No.: 2183-5238US

1/38

Figure 1: antibody titer in broilers (actively vaccinated with intermediate vaccine at 3 weeks)

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2/38

Fig.2a   Alignment of IBDV A-segment cDNA sequences

```
Consensus   GGATACGATC GGTCTGACCC CGGGGGAGTC ACCGGGGGAC AGGCTGACAA GGTCTTGTTC CAGGATGGAA CTCCT    75
CEF94-A     .......... .......... ....:..... .......... ....C.T... ..T....... .......... .....    75
D6948-A     .......... .......... .......... .......... ....T.A... ..C....... .......... .....    75
TY89-A      ---------- ---------- ---------- ---------- ---------- ---------- ---------- -----

Consensus   CCTTCTACAA TGCTATCATT GATGGTTAGT AGAGATCAGA CAAACGATCG CAGCCGATGAC AAGCCTGCAA GATCA'   150
CEF94-A     .......... C....:.... ...,...C... .......... .......... .......... A......... .....    150
D6948-A     .......... T......... .......T... .......... .......... .......... G......... .....    150
TY89-A      ---------- ---------- ---------- ---------- ---------- ---------- ---------- -----

Consensus   AACCCAACAG ATTGTTCCGT TCATACGGAG CCTTCTGATG CCAACAACCG GACCGGGGTC CATTCCGGAC GACAC    225
CEF94-A     .......... .......... .......... .......... .......... .......... .......... .....    225
D6948-A     .......... .......... .......... .......... .......... .......... .......... .....    225
TY89-A      ---------- ---------- ---------- ---------- ---------- ---------- ---------- -----

Consensus   CCTGAGGAAG CACACTCTCA GGTCAGAGAC CTCGACCTAC AATTTGACTG TGGGGGACAC AGGGTCAGGG CTAAT    300
CEF94-A     ...G...... .......... .......... .......... .......... .......... .......... .....    300
D6948-A     ...A...... .......... .......... .......... .......... .......... .......... .....    300
TY89-A      ---------- ---------- ---------- ---------- ---------- ---------- ---------- -----

Consensus   TGTCTTTTC CCTGGNTTCC CTGGCTCAAT TGTGGGTGCT CACTACACAC TGCAGAGCAA TGGGAACTAC AAGTT    375
CEF94-A     .......... .....A.... .......... .......... .......... .......... .......... .....    375
D6948-A     .......... .....T.... .......... .......... .......... .......... .......... .....    375
TY89-A      ---------- ---------- ---------- ---------- ---------- ---------- ---------- -----

Consensus   CGATCAGATG CTCCTGACTG CCCAGAACCT ACCGGCCAGT TACAACTACT GCAGGCTAGT GAGTCGGAGT CTCAC    450
CEF94-A     .......... .......... .......... .........T .......... .......... .......... .....    450
D6948-A     .......... .......... .......... .........C .......... .......... .......... .....    450
TY89-A      ---------- ---------- ---------- ---------- ---------- ---------- ---------- -----

Consensus   AGTGAGGTCA AGCACACTTC CTGGTGGCGT TTATGCACTA AATGGCACCA TAAACGCCGT GACCTTCCAA GGAAG    525
CEF94-A     .......... .........T. .......... .......... ..C......, .......... .......... .....    525
D6948-A     .......... .........C. .......... .......... ..T...... .......... .......... .....    525
TY89-A      ---------- ---------- ---------- ---------- ---------- ---------- ---------- -----

Consensus   CCTGAGTGAA CTGACAGATG TTAGCTACAA TGGGTTGATG TCTGCAACAG CCAACATCAA CGACAAAATT GGGAA    600
CEF94-A     .......... .......... .......... .......... .......... .......... .........T .....    600
D6948-A     .......... .......... ,......... .......... .......... .......... .........C .....    600
TY89-A      ---------- ---------- ---------- ---------- ---------- ---------- ---------- -----

Consensus   CGTCCTAGTA GGGGAAGGGG TGACCGTCCT CAGCTTACCC ACATCATATG ATCTTGGGTA TGTGAGGCTT GGTGA    675
CEF94-A     .......... .......... .C........ .......... .......... .......... ......G..T .....    675
D6948-A     .......... .......... .A........ .......... .......... .......... ......A..C .....    675
TY89-A      ---------- ---------- ---------- ---------- ---------- ---------- ---------- -----

Consensus   CCCCATTCCC GCNATAGGGC TTGACCCAAA AATGGTAGCN ACATGTGACA GCAGTGACAG GCCCAGAGTC TACAC    750
CEF94-A     .......... ..A....... .T........ .........C .......... .......... .......... .....    750
D6948-A     .......... ..T....... .C........ .........A .......... .......... .......... .....    750
TY89-A      ---------- ---------- ---------- ---------- ---------- ---------- ---------- -----

Consensus   CATAACTGCA GCCGATGATT ACCAATTCTC ATCACAGTAC CAAGCAGGTG GGGTAACAAT CACACTGTTC TCAGC    825
CEF94-A     .......... .......... .......... .......... ...C...... .......... .......... .....    825
D6948-A     .......... .......... .......... .......... ...G...... .......... .......... .....    825
TY89-A      ---------- ---------- ---------- ---------- ---------- ---------- ---------- -----

Consensus   TAATATTGAT GCCATCACAA GCCTCAGCGT TGGGGGAGAR CTCGTGTTTC AAACAAGCGT CCAGGGCCTT RTACT    900
CEF94-A     C..C..T... .......... .........G. T........G .......... .......... ...C...... G....'   900
D6948-A     T..T..C... .......... .........A. C........A .......... .......... ...A...... A....    900
TY89-A      ---------- ---------- ---------- ---------- ---------- ---------- ---------- -----

Consensus   GGGTGCTACC ATCTACCTTA TAGGCTTTGA TGGGACNGCG GTAATCACCA GRGCTGTGGC CGCAAACANT GGGCT    975
CEF94-A     ...C..C... ........C. .......... ......A... .......... .G........ ....A..... .....    975
D6948-A     ...T..T... ........T. .......... ......T... .......... .A........ ....G..... .....    975
TY89-A      ---------- ---------- ---------- ---------- ---------- ---------- ---------- -----
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DISEASE VIRUS VACCINES
Inventor: Boot et al.
Serial No.: 10/046,671
Docket No.: 2183-5238US

3/38

Fig.2a Contd. **Alignment of IBDV A-segment cDNA sequences**

Fig.2a Contd.   Alignment of IBDV A-segment cDNA sequences

Fig.2a Contd.   Alignment of IBDV A-segment cDNA sequences

Consensus	AGGACAGGCN	GARCCACCCC	AAGCYTTCAT	AGACGAAGTY	GCCARRGTCT	ATGAAATCAA	CCATGGRCGT	GGTCC	3000
CEF94-A	..........A	..G.......	....T.....	.........T	....AA....	....	......A...	..C..	3000
D6948-A	..........A	..G.......	....C.....	C	....AA....	....	......G...	..C..	3000
TY89-A	..........T	..A.......	....C.....	C	....GG....	....	......G...	..T..	784

Consensus	NAACCARGAR	CAGATGAAAG	AYCTGCTCTT	GACTGCGATG	GAGATGAAGC	ATCGCAATCC	CAGGCGGGCT	CTACC	3075
CEF94-A	A.....A..A	.........A.	.T......T.	....	....	....	....	.T...	3075
D6948-A	C.....A..A	.........A.	.T......C.	....	....	....	....	.C...	3075
TY89-A	A.....G..G	.........G.	.C......C.	....	....	....	....	.C...	779

Consensus	AAAGCCGAAG	CCAAAACCCA	ATGCTCCANC	ACAGAGACCC	CCTGGNCGGC	TGGGCCGCTG	GATCAGGGCB	GTCTC	3150
CEF94-A	......C...	....	........A.	....	.....T....	....	......A.C	.....	3150
D6948-A	......C...	....	........A.	....	.....T....	....	......G.T	.....	3150
TY89-A	......A...	....	........T.	....	.....A....	....	......A.G	.....	854

Consensus	TGAYGAGGAC	YTKGAGTGAG	GYWCCTGGGA	GTCTCCCGAC	ACCACCCGCG	CAGGYGTGGA	CACCAATTGR	KNNT	3225
CEF94-A	...T......	C.T.......	.TA.......	....	....,.....	....T.....	........CG	GACT.	3225
D6948-A	...T......	C.T.......	.CT.......	....	....	....C.....	........CG	GCCA.	3225
TY89-A	...C......	T.G.......	.CT.......	....	....	....T.....	........AA	TCAC.	929

Consensus	AGNNNATTCB	AAATTGGATC	CGTTCGCGGG	TCCCC	3260
CEF94-A	.CAAC..C.C	....	....	.....	3260
D6948-A	.CAAC..C.C	....	....	.....	3260
TY89-A	.GTGA..T.G	....	....	.....	964

6/38

Fig.2b   Alignment of IBDV B-segment cDNA sequences

```
Consensus   GGATACGATG GGTCTGACCC TCTGGGAGTC ACGAATTAAC GTGGCTACTA GGGGTGATGG CCGGCGGCTGG CTGCC      75
CEF94-B     .......... .......... .......... .......... .........: ....C...AA ..G.....G. .....      75
D6948-B     .......... .......... .......... .......... .......... ....T...GC ..A.....A. .....      75

Consensus   ACGTTAGTGG CTCCTCTTCT TGATGATTCT RCCACCATGA GTGACRTTTT CAATAGTCCA CAGGCGCGAA GCAMG      150
CEF94-B     .......... .......... .......... G......... .....A.... ...C...... .......... ...C.      150
D6948-B     .......... .......... .......... A......... .....G.... ...T...... .......... ...A.      150

Consensus   ATHTCAGCAG CGTTCGGCAT AAAGCCTACN GCTGGACARG AYGTGGAAGA ACTCTTGATC CCTAARGTTT GGGTG      225
CEF94-B     ..C....... .......... .........T .........A .C........ ....T..... .....A..T. .....      225
D6948-B     ..A....... .......... .........A .........G ..T....... ....C..... ....G..C. .....      225

Consensus   CCACCTGAGG ATCCSTTGGC CAGCCCTAGT CGACTGGCHA AGTTCCTCAG RGARAACGGC TACAARGTTT TGCAG      300
CEF94-B     .......... ....GC.T.. .......... ..A....A. .......... A..G..... .....AG..T .....      300
D6948-B     .......... ....CT.G.. .......... ..T....C. .......... G..A..... .....GA..C .....      300

Consensus   CCACGGTCTC TACCTGAGAA TGAGGAGTAT GAGACGGATC AAATACTCCC NGACTRAGCN TGGATGMGRC AGATA      375
CEF94-B     .......... .G..C..... .......... .........C .......... A...T....A ......C.A. .....      375
D6948-B     .......... .A..T..... .......... .........T .......... T...C....T ......A.G. .....      375

Consensus   GARGGRGCTG TTTTAAAACC NACTCTATCT CTCCCYATTG GAGATCAGGA GTACTTCCCN AARTACTACC CAACA      450
CEF94-B     ..A..G.... .......... C..T...... .....T.... ....T..... .........A ..G....... .....      450
D6948-B     ..G..A.... .......... A..C...... .....C.... ...C...... .........T ..A....... .....      450

Consensus   CAYCGCCCKA GCAAGGARAA GCCCAATGCG TACCCGCCMG AYATCGCAYT ACTCAAGCAG ATGRTYTACT TGTTT      525
CEF94-B     ..T.....T. .......G.. .......... .......A. .C......C. .......... ....T..C .....      525
D6948-B     ..C.....G. .......A.. .......... .......C. .T......T. .......... .....C...T .....      525

Consensus   CTCCAGGTTC CNGAGGCCAN NGARRGCCTN AARGATGARG TNACCCTRYT RACCCAAAAC ATNAGRGTATA ARGCC      600
CEF94-B     .......... .A.......A C..GGG...A ..G......A .A.....CT. G......... ..A..G..C. .G...      600
D6948-B     .......... ..C.......C A..TAA...T ..A.....G. .C.....AC. A......... ..T..A..T. .A...      600

Consensus   TAYGGRAGTG GGACCTACAT GGGACARGCH ACYGRACTTG TKGCYATGAA RGRGGTYGCC ACTGGGRAGAA ACCCA      675
CEF94-B     ..T..A.... .......... ......A..A ..TC...... .G..C..... G......C.. .......A.... .....      675
D6948-B     ..C..G.... .......... ......G..C ..CA...... .T..T..... A......T... .......G.... .....      675

Consensus   AACAARGATC CTCTAAAGCT TGGGTACACY TTTGAGAGCA TNGCSCAGCT ACTTGACATC ACMTYACCGG TAGGC      750
CEF94-B     ......G.... .......... .........T .......... .C..G..... .......... ..AC...... .....      750
D6948-B     ......A.... .......... .........C .......... .A..C..... .......... ..TT...... .....      750

Consensus   CCACCCGGTG AGGATGACAA GCCCTGGGTR CCACTCACAA GRGTGCCGTC AMGGATGTTG GTMCTGACGG GMGRC      825
CEF94-B     .......... .......... .........G .......... .A........ .C........ ..A....... .A...      825
D6948-B     .......... .......... .........A .......... .G........ .A........ ..T....... .C...      825

Consensus   GTAGATGGSG ANTTTGAGGT TGARGAYTAC CTTCCCAAAA TCAACCTCAA GTCATCAAGT GGACTRCCHT ATGTN      900
CEF94-B     ........C. .C........ ...A..T... .......... .......... .......... .....A..A. ....A      900
D6948-B     ........G. .A........ ...G..C... .......... .......... .......... .....G..C. ....T      900

Consensus   GGTCGCACCA AAGGAGARAC NATTGGNGAG ATGATAGCTA TNTCRAACCA GTTYCTYNNA GAGCTATCAR CRCTG      975
CEF94-B     .......... ....G.. A.....C... .......T. .C..A..... ....CA.... .......A .A...      975
D6948-B     .......... ......A.. T.....G... .........C. .A..G..... ......TC.. .......G .G...      975

Consensus   YTGAAGCARG GTGCAGGGAC AAARGGRTCR AACAAGAAGA AGCTRCTCAG CATGYTRAGT GACTAYTGGT ACTTA      1050
CEF94-B     T.......A. .......... ...G.....A .......... ....A..... ....T..... .....T.... .....      1050
D6948-B     C.......G. .......... ...A.....G .......... ....G..... ....C..... .....C.... .....      1050

Consensus   TCATGTGGGC TTTGTTTCC NAAGGCTGAR AGGTACGACA AAAGYACATG GCTCACCAAG ACCCGRAACA TATGG      1125
CEF94-B     .....C.... .......... A.......A .......... ....T..... .......... ......G.... .....      1125
D6948-B     .....T.... .......... C.........G .......... ....C..... .......... ......T.... .....      1125

Consensus   TCAGCTCCAT CNCCAACACA CCTCATGATC TCNATGATNA CCTGGCCCGT GATGTGCAAY AGCCCAAAYA ACGTG      1200
CEF94-B     .......... .C........ .......... ..T.....C. .......... .........C .........T. .....      1200
D6948-B     .......... .A........ .......... ..A.....A. .......... .........T .........C. .....      1200
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DISEASE VIRUS VACCINES
Inventor: Boot et al.
Serial No.: 10/046,671
Docket No.: 2183-5238US

7/38

Fig.2b Contd.   Alignment of IBDV B-segment cDNA sequences

```
Consensus   TTGAACATTG ARGGGTGTCC RTCACTCTAC AARTTCAACC CGTTYAGAGG NGGGYTRAAC AGGATCGTGG AGTGG  1275
CEF94-B     .......... .A........ A......... ..A....... ....C..... A...T.G... .........C. .....  1275
D6948-B     .......... .G........ G......... ..G....... ....T..... T...C.A... .........G. .....  1275

Consensus   ATANTGGCTC CGGANGAACC CAAGGCYTTW GTATATGCKG ACAACATATA CATTGTTCAC TCNAACACGT GGTAC  1350
CEF94-B     ...T....C. ....A..... ......TC.T .........G. .......... ......C... ..A....... .....  1350
D6948-B     ...A....T. ....T..... .....CT.A .........T. .......... ......T... ..C....... .....  1350

Consensus   TCAATTGACC TAGAGAAGGG TGAGGCAAAC TGCACRCGTC AACACATGCA RGCCGCNATG TACTACATWC TYACC  1425
CEF94-B     .......... .......... .......... ......T..C. .......... A.....A... .........A. .C...  1425
D6948-B     .......... .......... .......... ......G..T. .......... G.....C... .........C. .T...  1425

Consensus   AGAGGRTGGT CNGAYAACGG TGACCCNATG TTCAATCARA CATGGGCCAC CTTTGCNATG AACATTGCCC CNGCT  1500
CEF94-B     .....G.... .A..C..... C.....A... .........A. .......... ......C... .........T. .....  1500
D6948-B     .....A.... .C..T..... T.....C... .........G. .......... ......G... .........A. .....  1500

Consensus   CTAGTKGTGG ACTCATCRTG TCTGATWATG AACCTKCARA TYAAGACMTA TGGTCAAGGC AGYGGGAATG CAGCC  1575
CEF94-B     .....G.... .......G.. C.....A... .....G.A. .T.....C.. .......... ..C....... .....  1575
D6948-B     .....T.... .......A.. T.....T... .....T.G. .C.....A.. .......... ..T....... .....  1575

Consensus   ACGTTCATCA ACAACCAYCT YTTNAGCACG CTNGTGCTNG ACCNGTGGAA CTYGATGARR CARCCYAGNC CAGAC  1650
CEF94-B     ..G....... .,.....C.. CT.G....G ..A.....T. .......... .C......GA ..G..C..A. .....  1650
D6948-B     ..C....... .......T.. TC.T.....C ..T.....A. .......... .T......AG ..A..T..T. ......  1650

Consensus   AGCGARGAGT TCAARTCAAT TGARGACAAG CTRGGYATCA ACTTYAAGAT TGAGAGGTCC ATTGATGATA TTAGG  1725
CEF94-B     .....G.... ....A..... ...G...... ..A..T.... ....T..... .......... .........T. .C...  1725
D6948-B     .....A.... ....G..... ...A...... ..G..C.... ....C..... .......... .........C. .T...  1725

Consensus   GGCAAGCTGA GACAGCTTGT CCYCCTTGCA CAACCAGGGT ACCTGAGTGG RGGGGTTGAA CCAGAACAAY CCAGC  1800
CEF94-B     .........G. .......... ..T....... .......... .......... G.....T... .....A...T. .....  1800
D6948-B     .........C. .......... ..C....... .i........ .......... A.....C... .....G...C. .....  1800

Consensus   CCAACTGTTG AGCTKGACCT ACTNGGRTGG TCNGCNACWT ACAGCAAAGA TCTTGGGATC TATGTGCCGG TGCTT  1875
CEF94-B     .......T.. ....T..... ...A..G... ..A..T..A. .......... ...C...... .......... .....  1875
D6948-B     .........A. ....G..... ...C..A... ..T..A..T. .......... ...T...... .......... .....  1875

Consensus   GACAAGGAAC GCYTATTTTG TYCTGCTGCG TATCCCAARG GRGTAGNGAA YAARAGYCTC AARTCCAARG TYGGG  1950
CEF94-B     .......... ..C....... T......... .........G. .A....... C..G..T... ..G.....A. .C...  1950
D6948-B     .......... ..T....... C......... .........A. .G....... T..A..C... ..A.....G. .T...  1950

Consensus   ATCGAGCARG CATACAARGT NGTCAGGTAY GAGGCGTTGA GGTTGGTAGG TGGTTGGAAC TACCCACTCC TGRAC  2025
CEF94-B     .........G. ........G.. A.........T .......... .......... ..:....... .......... .....  2025
D6948-B     .........A. ........A.. T.........C .......... .......... .......... .......... .....  2025

Consensus   AAAGCTTGCA AGAAYAAYGC ARGYGCNGCT CGGCGGCATC TGGAGGCCAA GGGGTTCCCR CTCGAYGAGT TCCTN  2100
CEF94-B     .....C.... ....T..C.. .G.C..C... .......... .......... .........A .....C.... ....A  2100
D6948-B     .....T.... ....C..T.. .A.T..A... .......... .......... .........G .....T.... .....C  2100

Consensus   GCCGAGTGGT CWGAGTTGTC NGAGTTCGGN GARGCYTTCG AAGGCTTCAA TATCAAGCTG ACMGTAACAY CKGAG  2175
CEF94-B     .......... .T...C.... A.........T ..G..C.... .......... T......... ..C.....T .T...  2175
D6948-B     .......... .A...T.... C.........A ..A..T.... .......... C......... ..A.....C .G...  2175

Consensus   AGCCTNGCCG AACTKAACAR RCCAGTACCC CCCAARCCYC CAAATGTCAA CAGRCCAGTC AACACYGGKG GRCTN  2250
CEF94-B     .....A.... ....G....A G......... ....G..C. .......... .......... .....T..G. .A..C  2250
D6948-B     .....C.... ....T....G A......... .....A..T. .......... .......... .....C..T. .G..A  2250

Consensus   AAGGCAGTCA GCAAYGCCCT CAAGACCGGY CGGTAYAGRA AYGAAGCCGG ACTRAGTGGY CTCGTCCTYC TAGCC  2325
CEF94-B     .......... ....C..... .........T ....C..G. .C........ ...G....T .......T. .....  2325
D6948-B     .......... ....T..... .........C .....T..A. .T........ ...A.....C .........C. ......  2325

Consensus   ACMGCMNGRA GCCGNCTRCA NGAYGCAGTY AAGGCCAAGG CAGARGCCGA GAAACTCCAC AAGTCTAAGC CNGAY  2400
CEF94-B     ..A..AA.A. ....T..G.. A..T.....T .......... ....A..... .......... .....C.... .A..C  2400
D6948-B     ..C..CC.C. ....A..A.. G..C.....C .......... ....G..... .......... .....T.... .C..T  2400
```

Fig.2b Contd.   **Alignment of IBDV B-segment cDNA sequences**

```
Consensus   GACCCCCATG CAGACTGGTT TGAANGRTCA GAAACTCTGT CAGACCTTCT GGAGAAAGCC GACATTGCCA GCAAG   2475
CEF94-B     .......... .......... C...A.A... ......T.... .......T.. .......... .....C.... .....   2475
D6948-B     .......... .......... T...C.G... ......C.... .......G.. .......... .....T.... .....   2475

Consensus   GTCGCTCACT CAGCACTCGT GGAAACAAGC GACGCTCTTG AAGCRGTTCA GTCRACTTCA GTGTACACTC CWAAG   2550
CEF94-B     .....C.... .......... .......... .....C.... ....A..T.. ...G..T..C ........T. .C...   2550
D6948-B     .....T.... .......... .......... .....T.... ....G..C.. ...A..C..A ........C. .A...   2550

Consensus   TACCCAGARG TYAAGAACCC ACAGACCGCC TCCAACCCCG TTGTTGGGCT CCACCTGCCC GCCANGAGRG CCACC   2625
CEF94-B     ........A. .C........ .......... .......... .......... .......... ........A. .....   2625
D6948-B     ........G. .T........ .......... .......... .......... .......... ........G. .....   2625

Consensus   GGTGTCCAGG CAGCTCTTCT CGGAGCAGGA ACGAGCAGAC CAATGGGGAT GGAGGCTCCA ACACGGTCCA AGAAC   2700
CEF94-B     .......... .C........ .........A .......... .......... ......C... .......... .....   2700
D6948-B     .......... .A........ .........G .......... .......... ......T... .......... .....   2700

Consensus   GCCGTGAAAA TGGCCAAAMG GCGGCAACGC CAAAARGAGA GCCGCCAAYA GCCATGMTGG GACCCACTCA AGAAG   2775
CEF94-B     .......... ........C. .......... .....G.... ........C. .......... .......... .....   2775
D6948-B     .......... ........A. .......... .....A.... ........T. .......... .......... .....   2775

Consensus   AGGACACTAA TCCCAGACCC COTATCCCCG GCCTTCGCCT GCGGGGGCCC CC                         2827
CEF94-B     .......... T......... .......... .......... .......... ..                         2827
D6948-B     .........; C......... .......... .......... .......... ..                         2827
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9/38

Fig.3a   IBDV polyprotein alignment

```
Consensus    MTNLQDQTQQ IVFFIRSLLM FTTGPASIPD DTLEKHTLRS ETSTNLTVG DTGSGLIVFF PGFPGSIVGA HYTLQ    75
CEF94-PP     .......... .......... .......... .......... .......... .......... .......... .....    75
D6948-PP     .......... .......... .......... .......... .......... .......... .......... .....    75
TY89-PP      ---------- ---------- ---------- ---------- ---------- ---------- ---------- -----

Consensus    SNGNYKPDQM LLTAQNLPAS YNYCRLVSRS LTVRSSTLPG GVYALNGTIN AVTFQGSLSE LTDVSYNGLM SRTAN   150
CEF94-PP     .......... .......... .......... .......... .......... .......... .......... .....   150
D6948-PP     .......... .......... .......... .......... .......... .......... .......... .....   150
TY89-PP      ---------- ---------- ---------- ---------- ---------- ---------- ---------- -----

Consensus    INKIGNVLV GEGVTVLSLP TSYDLGYVRL GDPIPAIGLD PKMVATCDSS DRPRVTVTTA ADDYQFSSQY Q.GGV   225
CEF94-PP     .......... .......... .......... .......... .......... .......... .......... .P...   225
D6948-PP     .......... .......... .......... .......... .......... .......... .......... .A...   225
TY89-PP      ---------- ---------- ---------- ---------- ---------- ---------- ---------- -----

Consensus    TITLFSANID AITSLS.GGE LVFQTSV.GL .LGATIYLIG FDQTAVITRA VAA.NGLT.G TDNL.FFN.V IFT.E   300
CEF94-PP     .......... ......V... ........H.. V......... .......... ...N....T. ....L...L. ...N.   300
D6948-PP     .......... ......I... ........Q.. I......... .......... ...D....A. ....M...I. ...S.   300
TY89-PP      ---------- ---------- ---------- ---------- ---------- ---------- ---------- -----

Consensus    ITQFITSIKL EIVTSKSGGQ AGDQMSWSA. QSLAVTIHGG NYPGALRFVT LVAYERVATG SVVFVAGVEN FELIP   375
CEF94-PP     .......... .......... .........R .......... .......... .......... .......... .....   375
D6948-PP     .......... .......... .........S .......... .......... .......... .......... .....   375
TY89-PP      ---------- ---------- ---------- ---------- ---------- ---------- ---------- -----

Consensus    NFELAKRLVT EYGRFDPGAM NYTKLILSER DRLGIKTVWP TRETYDFRET FNEVADLNSP LKIAGAFGFK DIIRA   450
CEF94-PP     .......... .......... .......... .......... .......... .......... .......... .....   450
D6948-PP     .......... .......... .......... .......... .......... .......... .......... .....   450
TY89-PP      ---------- ---------- ---------- ---------- ---------- ---------- ---------- -----

Consensus    .RRIAVPVVS TLFPPAAPLA ERIGRGVDYL LGDEAQAASG TARAASGKAR AASGRIRQLP LAADKGYEVV ANLFQ   525
CEF94-PP     I......... .......... .......... .......... .......... .......... .......... .....   525
D6948-PP     L......... .......... .......... .......... .......... .......... .......... .....   525
TY89-PP      ---------- ---------- ---------- ---------- ---------- ---------- ---------- -----

Consensus    VPQNFVVDGI LASFG.LRGA NNLDCVLREG ATLFFVVITT VEDANTFKAL NSKNFAVIEG VREDLQFFSQ RGSVI   600
CEF94-PP     .......... .....V.... .......... .......... .......... .......... .......... .....   600
D6948-PP     .......... .....I.... .......... .......... .......... .......... .......... .....   600
TY89-PP      ---------- ---------- ---------- ---------- ---------- ---------- ---------- -----

Consensus    RTLSGHRVYG YAPDGVLFLE TGRDTTVVPI DDVWDDSIKL SKDPIPPIVG NSGNLAIAYM DVFRPKVPIR VAMTG   675
CEF94-PP     .......... .......... .......... .......... .......... .......... .......... .....   675
D6948-PP     .......... .......... .......... .......... .......... .......... .......... .....   675
TY89-PP      ---------- ---------- ---------- ---------- ---------- ---------- ---------- -----

Consensus    ALNA.GHIK. VSFRSTRLAT AERLGLKLAG FGAFDVNTG. NNRTYIKRYP HNIFRIMGNLP YLNLFYLFPN AGRQY   750
CEF94-PP     ....C....K .......... .......... .........F .......... .......... .......... .....   750
D6948-PP     ....Y....N .......... .......... .........S .......... .......... .......... .....   750
TY89-PP      ---------- ---------- ---------- ---------- -------... .......... ..........T ....F    28

Consensus    HLAMAASEFK RTPELESAVR AMEAAANVDP LFQSALSVFM WLEENGIVTD MANFALGDHN AHSGNGFLAN APQAG   825
CEF94-PP     .......... .......... .......... .......... .......... .......... .......... .....   825
D6948-PP     D......... .......... ..........  .......... .......... .......... .......... .....   825
TY89-PP      ...L...... ......D... ...D....... ..R...Q... .......... .......... ....K..... .....   103

Consensus    SKSQRAKYGT AGYGVEARGP TFEEAQREKD.TRISKKMETM GIYFATPEWV ALNGHRGPSP GQLKYWQNTR EIPDP   900
CEF94-PP     .......... .......... .......... .......... .......... .......... .......... .....   900
D6948-PP     .......... .......... .......... .......... .......... .......... .......... .....   900
TY89-PP      .......... .......... .......... .......... .......... .......... ..........E.   178

Consensus    NEDYLDYVHA EKERLASEEQ ILRAMTGIYG APGQAEPPQA FIDEVAKVYE INHGRGPNQR QMIKLLLTAM HNKHR   975
CEF94-PP     .......... .......... .......... .......... .......... .......... .......... .....   975
D6948-PP     .......... .......... .......... .......... .......... .......... .......... .....   975
TY89-PP      ....P..... .......... V......... .......... ........R... .......... .......... .....   253

Consensus    NFRRAPPKPK PKPNAFTQRP PGRLGRWIRT VSDEDLE                                             1012
CEF94-PP     .....L.... .......... .......... .......                                            1012
D6948-PP     .......... .......... ..........A ........                                            1012
TY89-PP      .......... ......S... .......... .......                                             290
```

10/38

Fig.3b   **IBDV VP1 alignment**

```
Consensus    MSD.FHSPQA RS.ISAAFGI KFTAGQDVRE LLIFKVWVFF EDFLASFGRL AKVLRRMGYK .LQFRSLFWH KKYET      75
CEF94-VP1    ...I...... ..T....... .......... .......... .......... .......... V......... .....      75
D6948-VP1    ...V...... ..K....... .......... .......... .......... .......... I......... .....      75

Consensus    DQILPDLAWM RQIEGAVLKP TLSLFIGDQE YFFKYYFTHR PSKKFMRAYP FDIALLKQMI YLFLQVFEA. ...LKD     150
CEF94-VP1    .......... .......... .......... .......... .......... .......... .........N RQ...      150
D6948-VP1    .......... .......... .......... .......... .......... .......... .........? DR...      150

Consensus    EVFLLTQMIR DKAYGSGYYN GQATRLVARK EVATGRNFMK DFLKLGYYFE SIAQLLDITL PVGPPGDUK MWVFL         225
CEF94-VP1    .......... .......... .......... .......... .......... .......... .......... ......      225
D6948-VP1    .......... .......... .......... .......... .......... .......... .......... ......      225

Consensus    TRVFSRMLVL TGDVDG.FKV EDYLFKINLK RSSGLFVVGR TKGSTIGRMI AISNQVLRRL S.LLKQQMQT RDRMK         300
CEF94-VP1    .......... .....D.... .......... .......... .......... .......... .T........ .....      300
D6948-VP1    .......... ......K... .......... .......... .......... .......... .A........ .....      300.

Consensus    KKLLAHLADY WYLSCGLLFP KAERYDKSTW LTKTRNIWEA PSPTHLHIEM ITWFAMNSP MMVLMIEGCF SLYKP         375
CEF94-VP1    .......... .......... .......... .......... .......... .......... .......... .....      375
D6948-VP1    .......... .......... .......... .......... .......... .......... .......... .....      375

Consensus    NPFRGGLNKI VEMI.AP.EF KALVYADNIY IVHSNTWYSI DLKIGRANCT RQRHQAAHTY ILTRGMSDNG DFHFH        450
CEF94-VP1    .......... ....L..E.. .......... .......... .......... .......... .......... .....      450
D6948-VP1    .......... ....M..D.. .......... .......... .......... .......... .......... .....      450

Consensus    QTWAFFAHHI APALVVDSSC LIHHLQIKTY GQGSGNAATF INHLLGTLV LDQRKM.QP .FDREYKKI HKKLG           525
CEF94-VP1    .......... .......... .......... .......... .......... .......R.. R......... .....      525
D6948-VP1    .......... .......... .......... .......... .......... .......K.. S......... .....      525

Consensus    IHFKIERSID DIRGHLAQLV .LAQFGYLSG GVHFEQ.SFT VELDLLGMMA TYSKDLGIYV FVLDKRHLFC SAAYF         600
CEF94-VP1    .......... .......... L......... ......K... .......... .......... .........,. .....      600
D6948-VP1    .......... .......... F.........  ......F... .......... .......... .......... .....      600

Consensus    KGVKKSLKS KVGIEQAYKV VRYEALRLVG GWNYFLLMKA CKHHA.AAKR HLKARGFFLD EVLAEHSKLS HFGRA          675
CEF94-VP1    .......... .......... .......... .......... .....G.... .......... .......... .....      675
D6948-VP1    .......... .......... .......... .......... .....S.... .......... .......... .....      675

Consensus    FEGYHIKLTV T.ESLAKLM. PVPPKPPHVM RFVNTGGLKA VEHALKYGRY RHRAGLRGLV LLATARSKLQ DAVKA        750
CEF94-VP1    .......... .S.......K .......... .......... .......... .......... .......... .....      750
D6948-VP1    .......... .F.......R .......... .......... .......... .......... .......... .....      750

Consensus    KARAKKLSKS KFDDPDADMF ERSETLSDLL HKADIASKVA HEALVETSDA LKRVQSTSVT TMKYFEVEMF QTRAGN       825
CEF94-VP1    .......... .......... .......... .......... .......... .......... .......... .....      825
D6948-VP1    .......... .......... .......... .......... .......... .......... .......... .....      825

Consensus    PVVGLHLPAK RATGVQAALL GAGTSRPMGK KAFTRSKNAV KMAKRRQRQK ESRQ..               881
CEF94-VP1    .......... .......... .......... .......... .......... ....QP               881
D6948-VP1    .......... .......... .......... .......... .......... ....--               879
```

11/38

Fig. 3c   IBDV VP5 alignment.

Consensus	MVSRDQTNDR	SDD.PARSHP	TDCSVHTEPS	DANHRTGVHS	GRHP.RAHSQ	50
D6948-VP5	....	...R......	....	....	....R.....	50
CEF94-VP5	.....:....	...K......	....	....	....G.....	50
Consensus	VRDLDLQFDC	GGHRVRANCL	FPW.PWLNCG	CSLHTARQWE	LQVRSDAPDC	100
D6948-VP5	....	....	...P......	....	....	100
CEF94-VP5	....	....	...I.......	....	....	100
Consensus	PEPTGQLQLL	QASESESHSE	VKHT.WMRLC	TK.HHKRRDL	PRKPE	145
D6948-VP5	....	....	....P.....	..W.......	.....	145
CEF94-VP5	....	....	....S.....	..R.......	.....	145

TITLE: MOSAIC INFECTIOUS BURSAL
DISEASE VIRUS VACCINES
Inventor: Boot et al.
Serial No.: 10/046,671
Docket No.: 2183-5238US

12/38

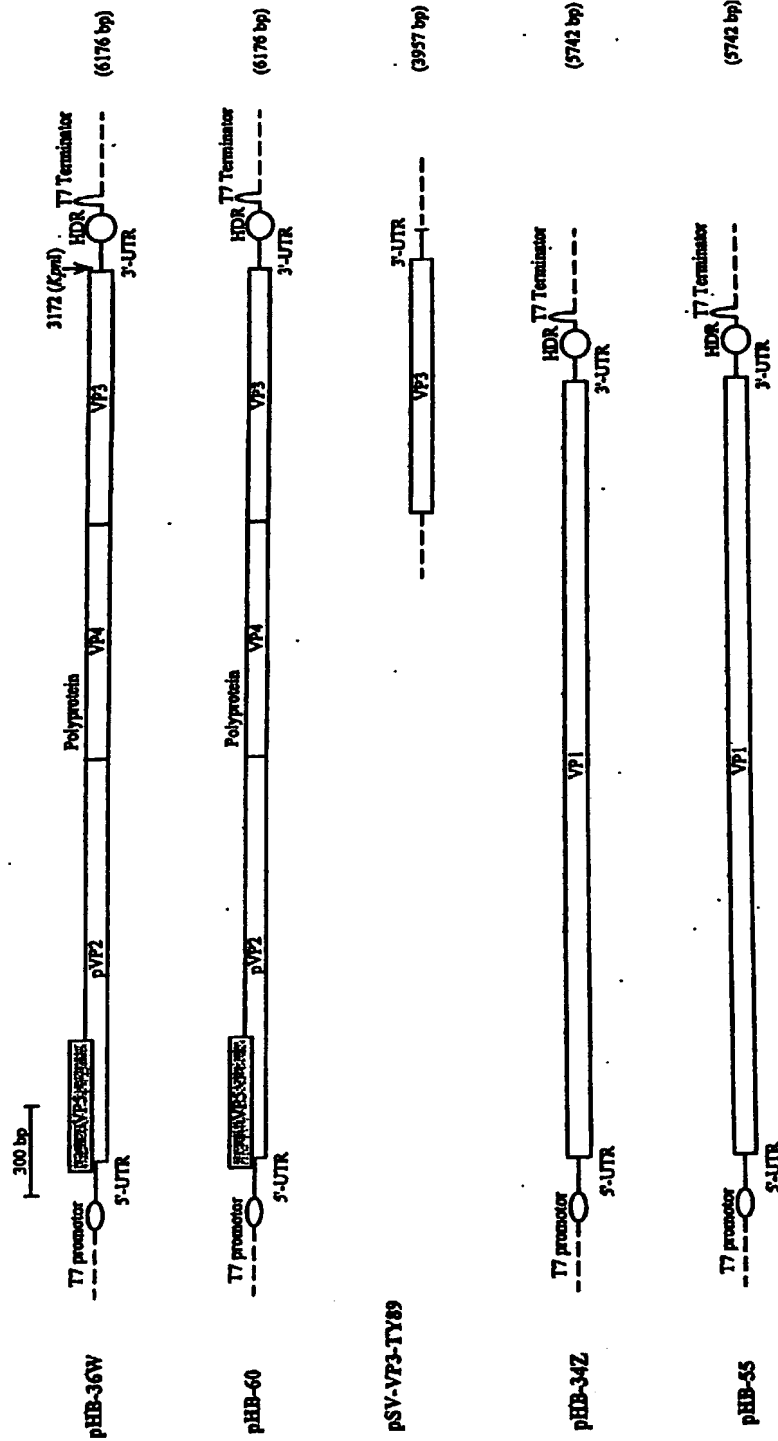Fig. 4   Schematic representation of the used plasmids

TITLE: MOSAIC INFECTIOUS BURSAL
DISEASE VIRUS VACCINES
Inventor: Boot et al.
Serial No.: 10/046,671
Docket No.: 2183-5238US

13/38

Fig. 5a   Schematic representation of the construction of PCR fragment PCR-VP2d
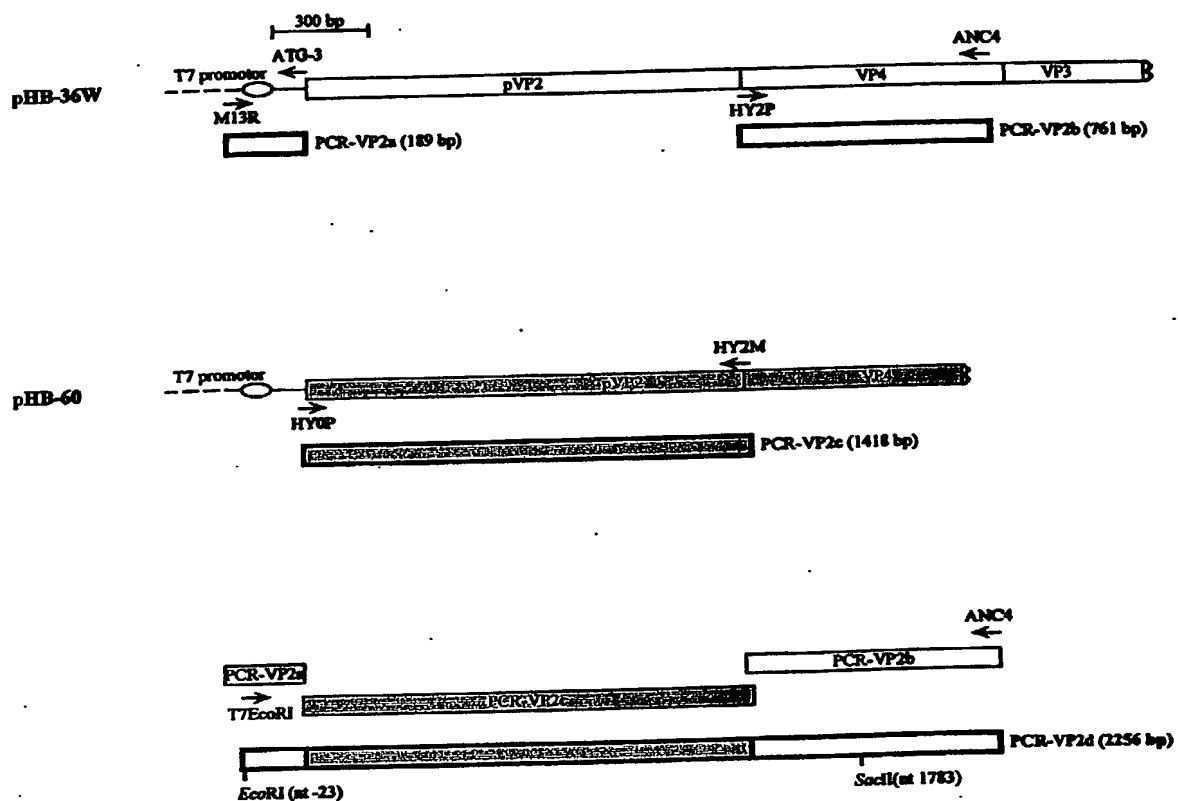
14/38

Fig. 5b Schematic representation of the construction of PCR fragment PCR-VP3c

TITLE: MOSAIC INFECTIOUS BURSAL
DISEASE VIRUS VACCINES
Inventor: Boot et al.
Serial No.: 10/046,671
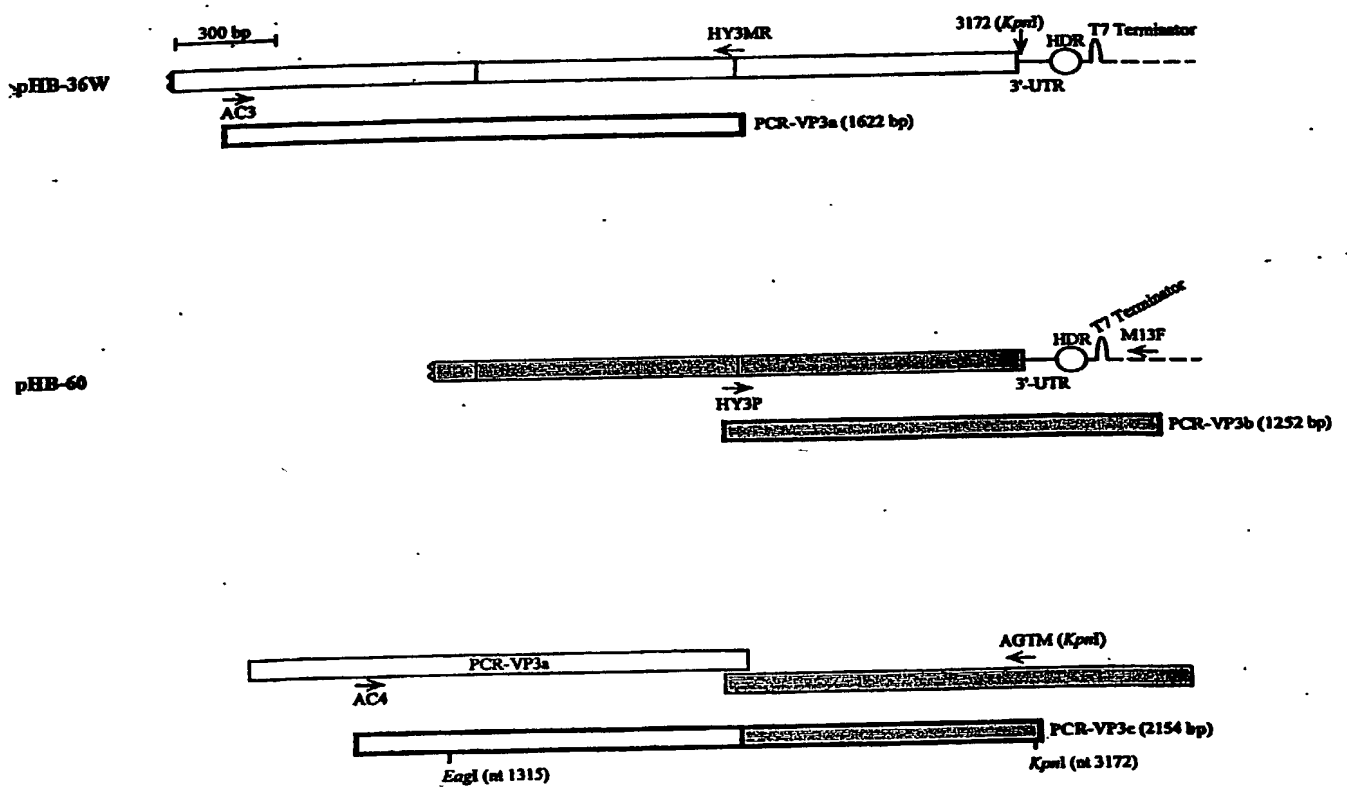Docket No.: 2183-5238US

15/38

Fig. 5c   Schematic representation of the construction of PCR fragment PCR-VP4d

TITLE: MOSAIC INFECTIOUS BURSAL
DISEASE VIRUS VACCINES
Inventor: Boot et al.
Serial No.: 10/046,671
Docket No.: 2183-5238US

16/38

Fig. 5d   Schematic representation of the construction of plasmid pHB36-d2VP3

TITLE: MOSAIC INFECTIOUS BURSAL
DISEASE VIRUS VACCINES
Inventor: Boot et al.
Serial No.: 10/046,671
Docket No.: 2183-5238US

17/38

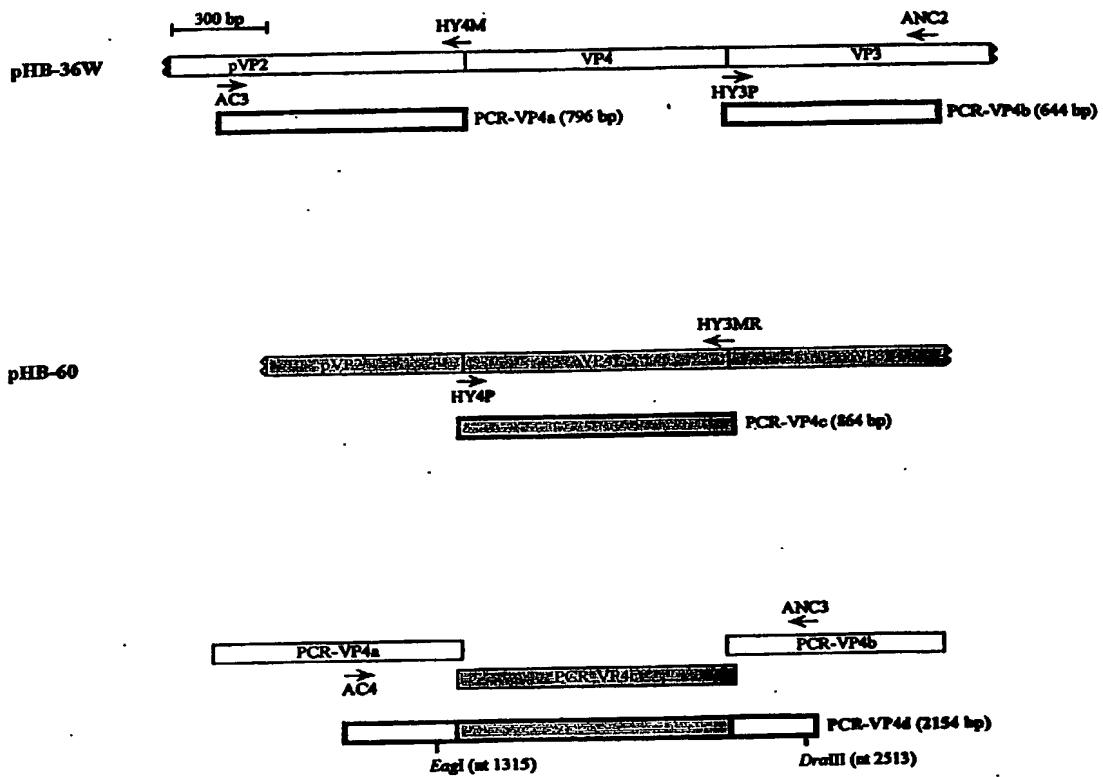Fig. 5e   Schematic representation of the construction of plasmid pHB36-αVP3C

TITLE: MOSAIC INFECTIOUS BURSAL
DISEASE VIRUS VACCINES
Inventor: Boot et al.
Serial No.: 10/046,671
Docket No.: 2183-5238US

18/38

Fig. 5f   Schematic representation of the construction of plasmid pHB36-Δ2VP3N

TITLE: MOSAIC INFECTIOUS BURSAL
DISEASE VIRUS VACCINES
Inventor: Boot et al.
Serial No.: 10/046,671
Docket No.: 2183-5238US

19/38

Fig. 5g   Schematic representation of the construction of plasmid pHB60-Δ2VP3C1

TITLE: MOSAIC INFECTIOUS BURSAL
DISEASE VIRUS VACCINES
Inventor: Boot et al.
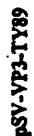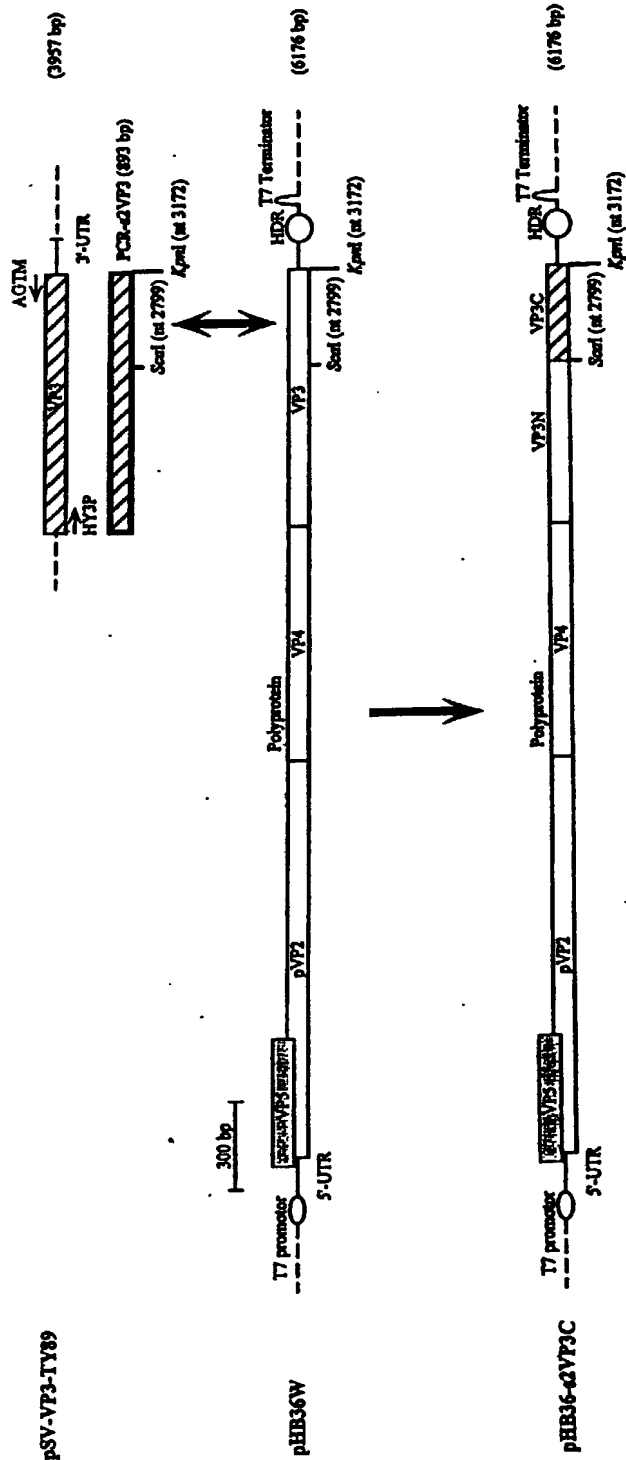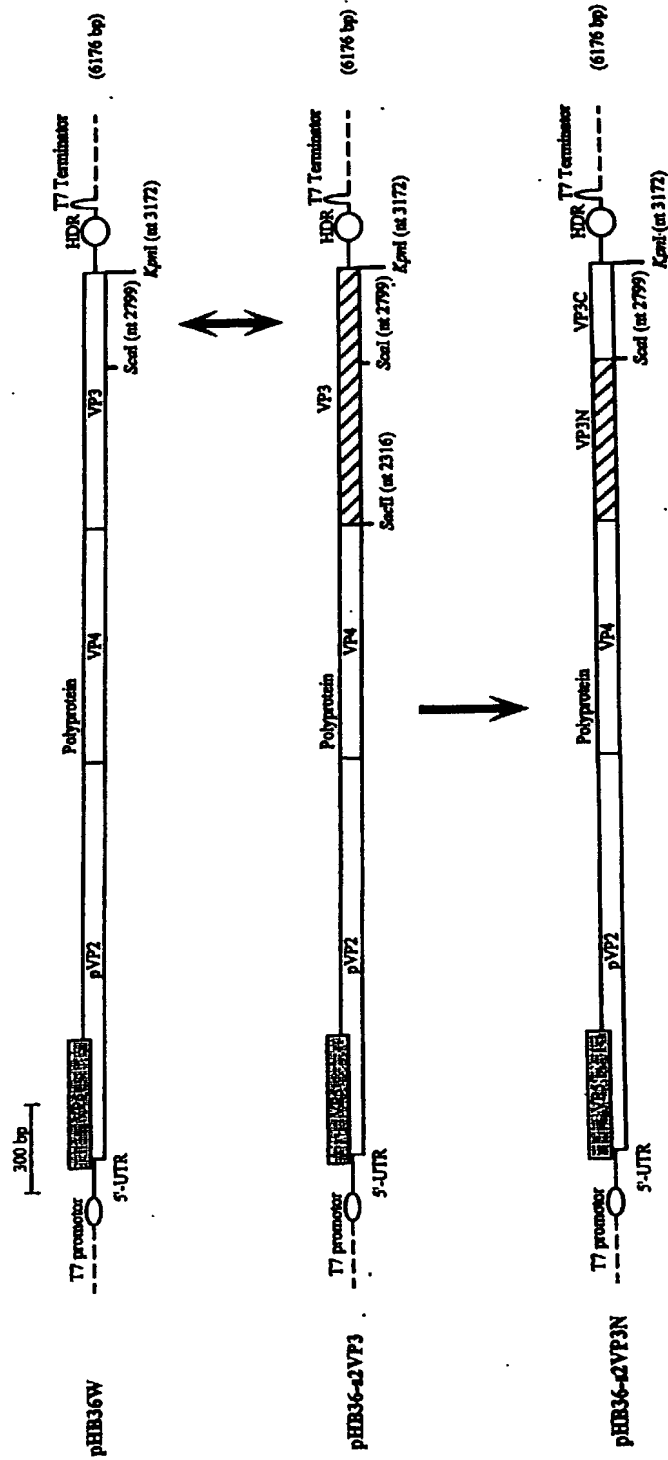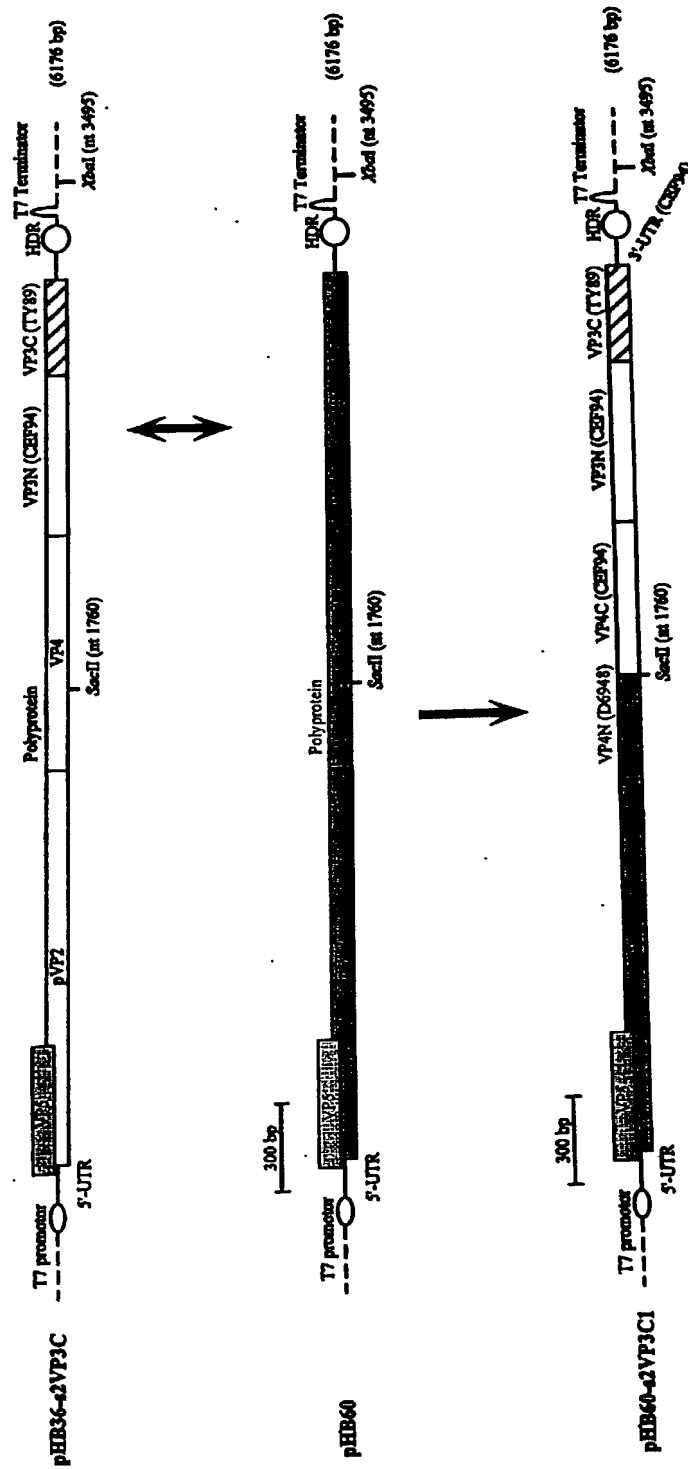Serial No.: 10/046,671
Docket No.: 2183-5238US

20/38

Fig. 6

```
                     VP4 ◄─── ───► VP3

            ↙SacII
CEF94-PP   724-FPHNPRD WDRLPYLNLP YLPPNAGRQY HLAMAASEFK ETPELESAVR AMEAAANVDP LFQSALSVFM WLSENGIVTD 800
TY89-PP    724-....... .......... ...T...P ..L...... ......D... ..D....... ..R...Q... .......... 800

                                                                        ↙ScaI
CEF94-PP   MANFALSDPN AHRMRNFLAN APQAGSKSQR AKYGTAGYGV EARGPTPEEA QREKDTRISK KMETMGIYFA TPEWVALNGR 880
TY89-PP    .......... ....K..... .......... .......... .......... .......... .......... .......... 880

CEF94-PP   RGPSPGQLKY WQNTREIPDP NEDYLDYVHA EKSRLASEEQ ILRAATSIYG APGQAEPPQA FIDEVAKVYE INHGRGPNQE 960
TY89-PP    .......... ....E..... ....P..... .......... .......... V......... ......R... .......... 960

CEF94-PP   QMKDLLLTAM EMKERNPRRA LPKPKPKPNA PTQRPPGRLG RMIRTVSDED LE 1012
TY89-PP    .......... .......... ....P..... ....S..... .......... .. 1012
```

TITLE: MOSAIC INFECTIOUS BURSAL
DISEASE VIRUS VACCINES
Inventor: Boot et al.
Serial No.: 10/046,671
Docket No.: 2183-5238US

21/38

Fig. 7

TITLE: MOSAIC INFECTIOUS BURSAL
DISEASE VIRUS VACCINES
Inventor: Boot et al.
Serial No.: 10/046,671
Docket No.: 2183-5238US

22/38

Fig. 8C

Fig. 8B

Fig. 8A

TITLE: MOSAIC INFECTIOUS BURSAL
DISEASE VIRUS VACCINES
Inventor: Boot et al.
Serial No.: 10/046,671
Docket No.: 2183-5238US

23/38

Fig. 9

Fig. 10

TITLE: MOSAIC INFECTIOUS BURSAL
DISEASE VIRUS VACCINES
Inventor: Boot et al.
Serial No.: 10/046,671
Docket No.: 2183-5238US

·25/38

Fig. 11

Schematic representation of plasmids pHB60-s2VP3C1 and pHB60-s2VP3C3

TITLE: MOSAIC INFECTIOUS BURSAL
DISEASE VIRUS VACCINES
Inventor: Boot et al.
Serial No.: 10/046,671
Docket No.: 2183-5238US

26/38

Fig. 12

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DISEASE VIRUS VACCINES
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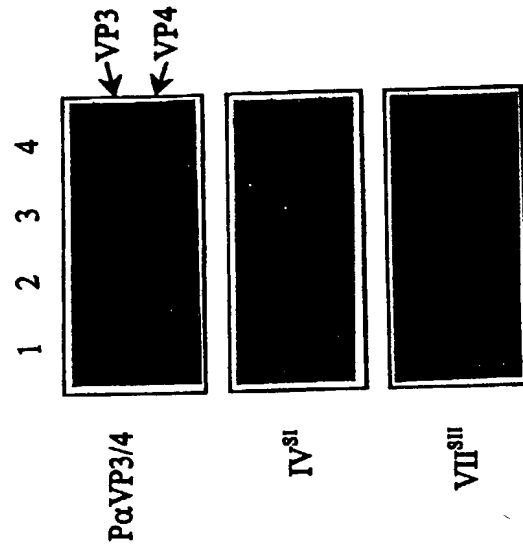Serial No.: 10/046,671
Docket No.: 2183-5238US

27/38

Fig. 13

```
                    VP4 ◄───────► VP3

          ↙ SacII
CEF94-PP  724-FPHNPRD WDRLPYLNLP YLPPNAGRQY HLAMAASFFK ETPELESAVR AMEAAANVDP LFQSALSVFM WLEENGIVTD 800
D6948     724-....................................T...F ...L.................D.............R...Q.............. 800
TY89-PP   724-....................................T...F ...L..............D....D.............R...Q.............. 800

                                                              ↙ ScaI
CEF94-PP  MANFALSDPN AHRMRNFLAN APQAGSKSQR AKYGTAGYGV EARGPTPEEA QREKDTRISK KMETMGIYFA TPEWVALNGH 880
D6948     ........................................................................................... 880
TY89-PP   ....................K...................................................................... 880

CEF94-PP  RGPSPGQLKY WQNTREIPDP NEDYLDYVHA EKSRLASEEQ ILRAATSIYG APGQAEPPQA FIDEVAKVYE INHGRGPNQE 960
D6948     ..............................E................V..........................R.............. 960
TY89-PP   ..............................P............................................................ 960

CEF94-PP  QMKDLLLTAM EMKHRNPRRA LPKPKPKPNA PTQRPGRLG RWIRTVSDED LE 1012
D6948     ..................P..............A....................... 1012
TY89-PP   ..................P..............S....................... 1012
```
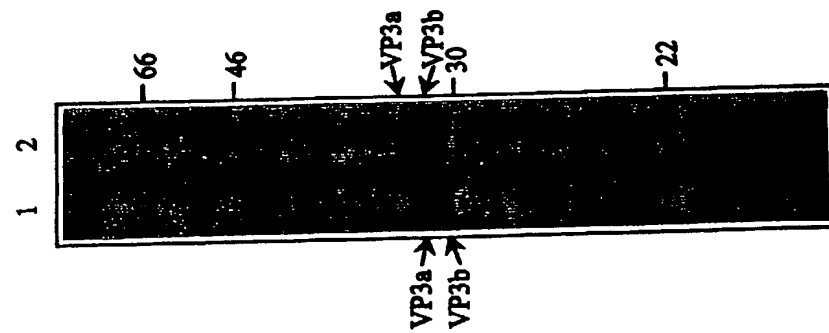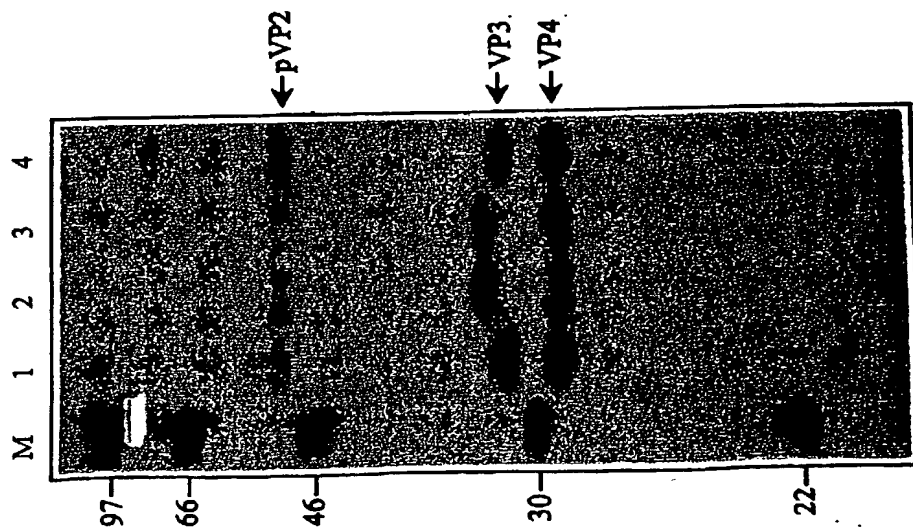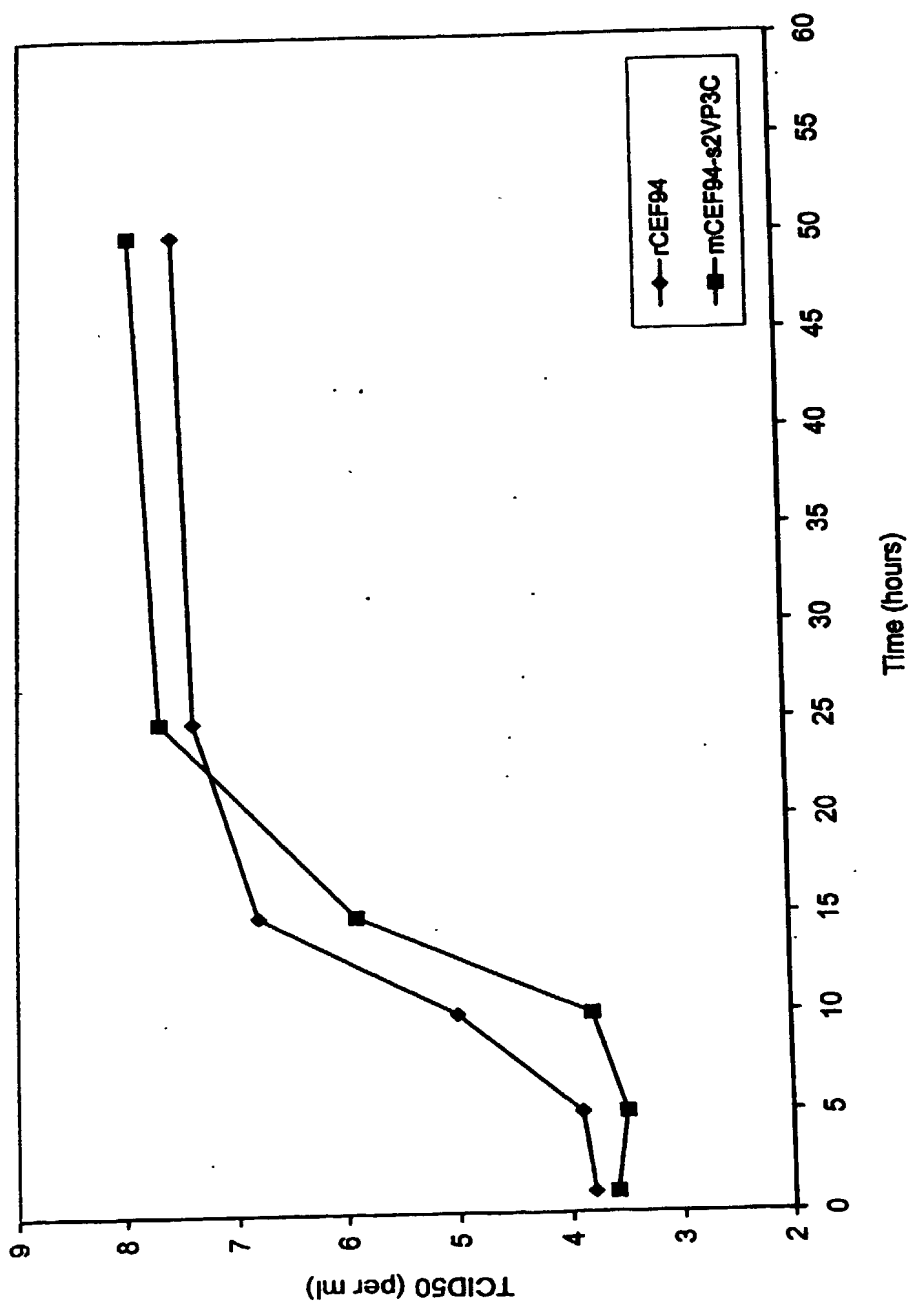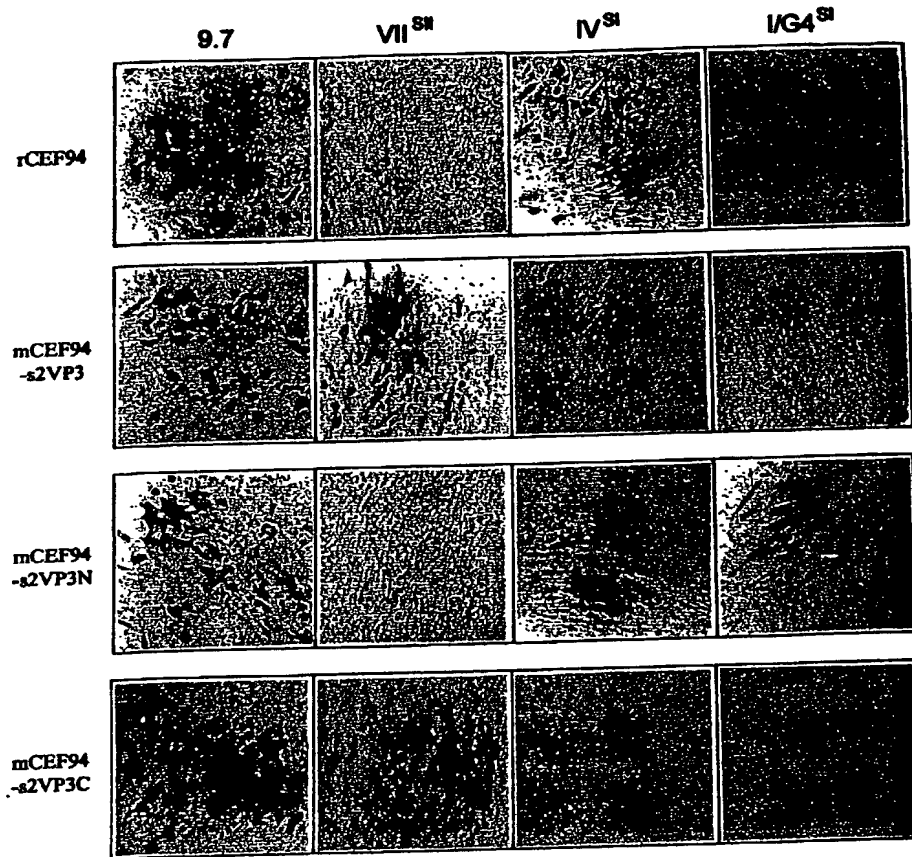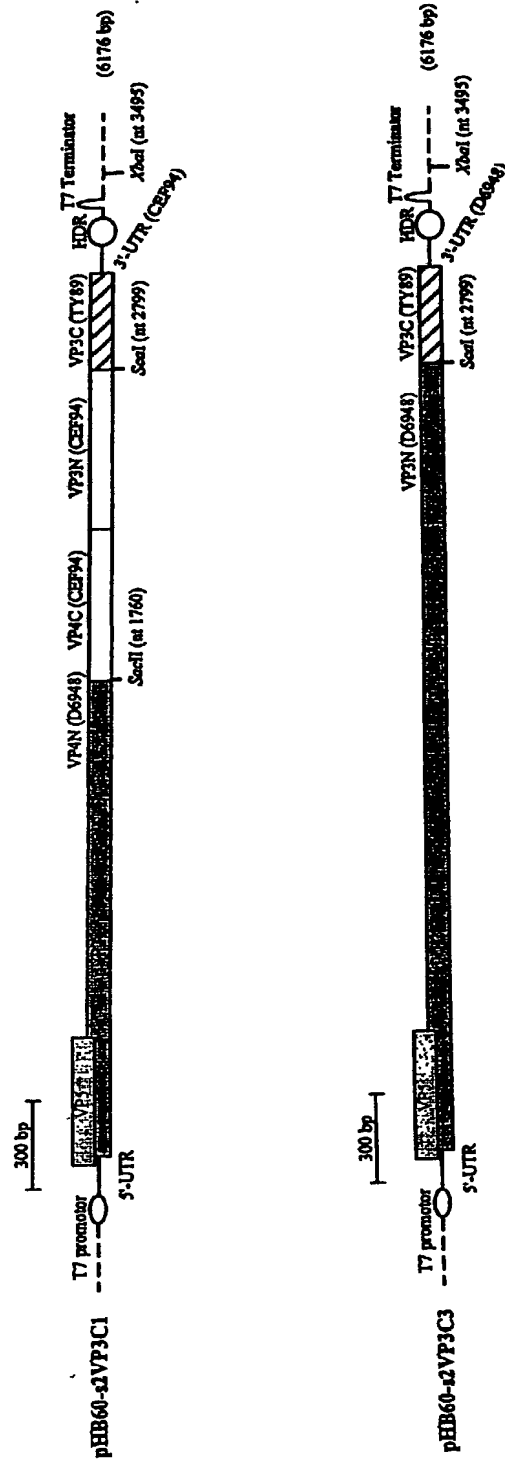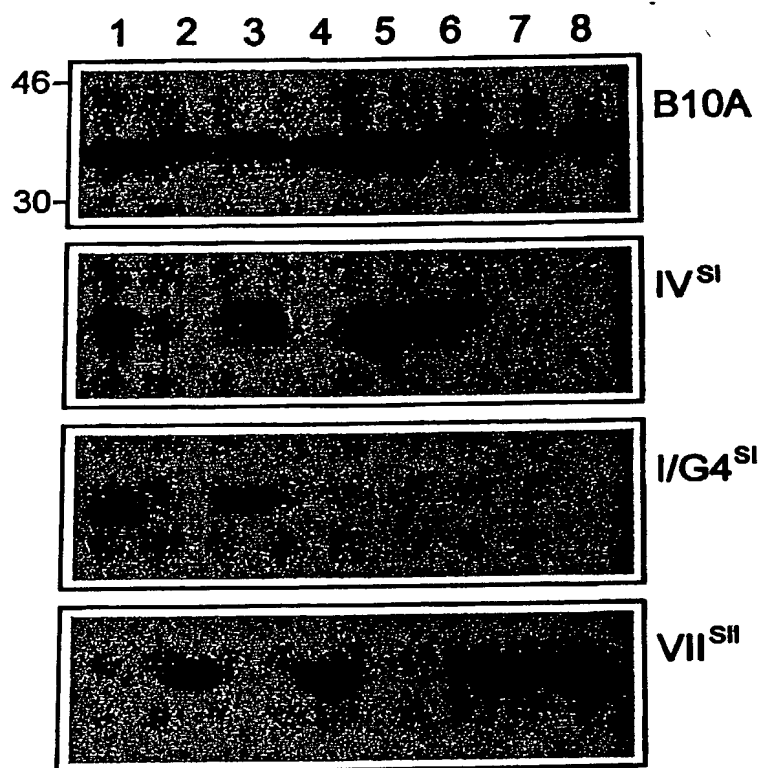
TITLE: MOSAIC INFECTIOUS BURSAL
DISEASE VIRUS VACCINES
Inventor: Boot et al.
Serial No.: 10/046,671
Docket No.: 2183-5238US

28/38

Fig. 14

Mock

D6948

mD6948-s2VP3C1

mD6948-s2VP3C3

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DISEASE VIRUS VACCINES
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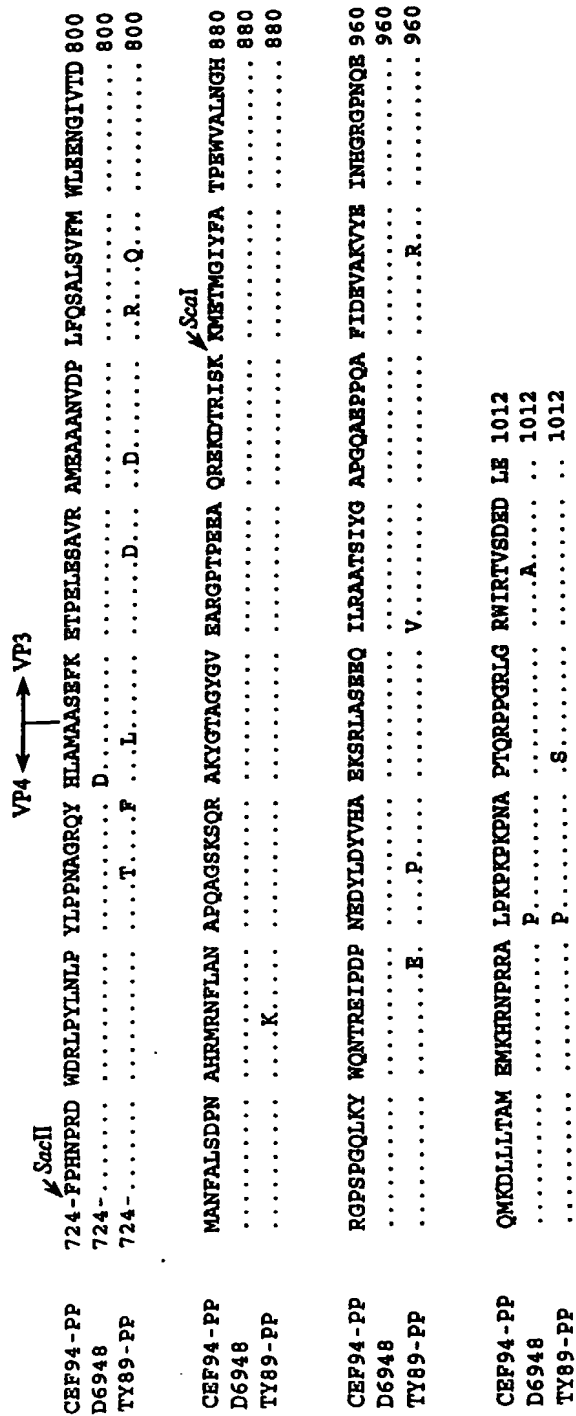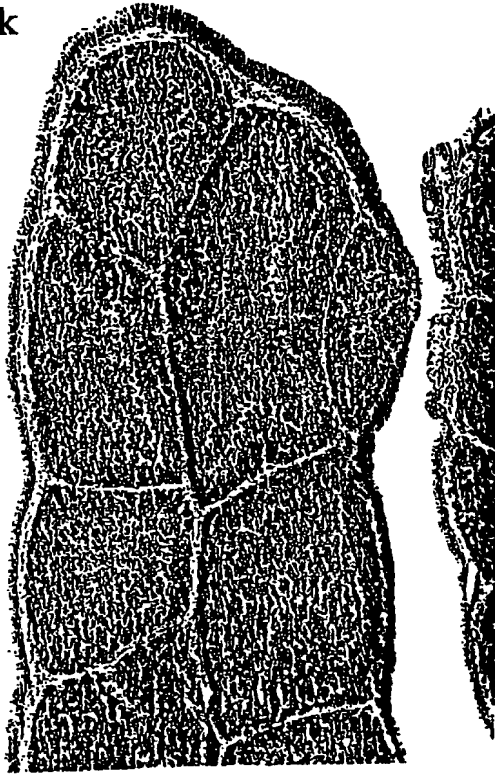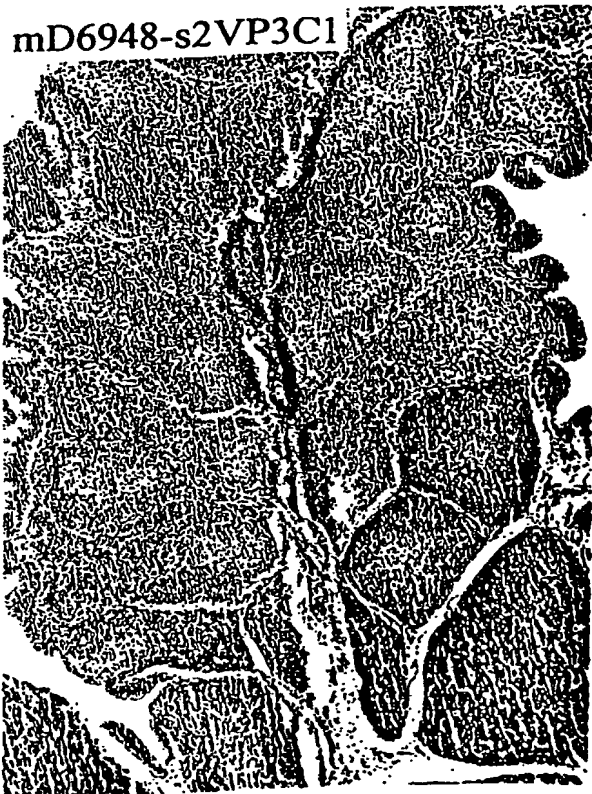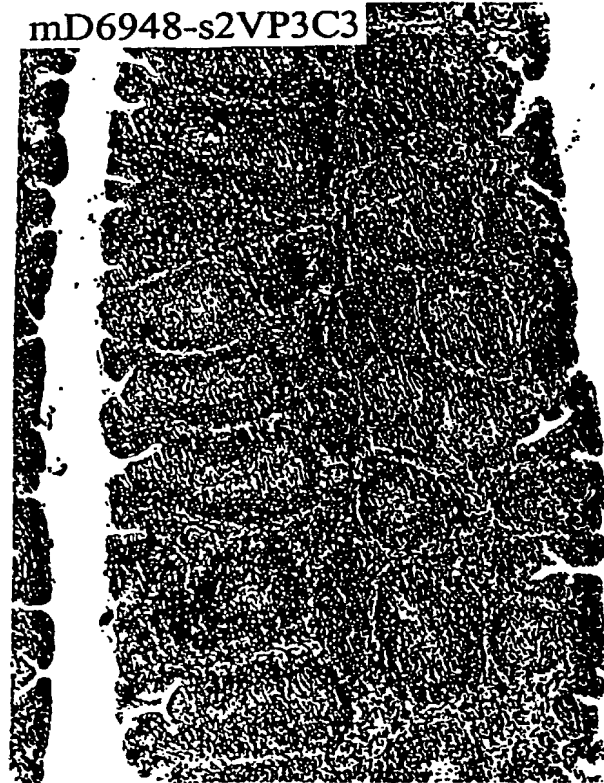Serial No.: 10/046,671
Docket No.: 2183-5238US

29/38

FIG. 15

Competition Elisa with Mab I/G4^{SI}

Competition Elisa with Mab IV^{SI}
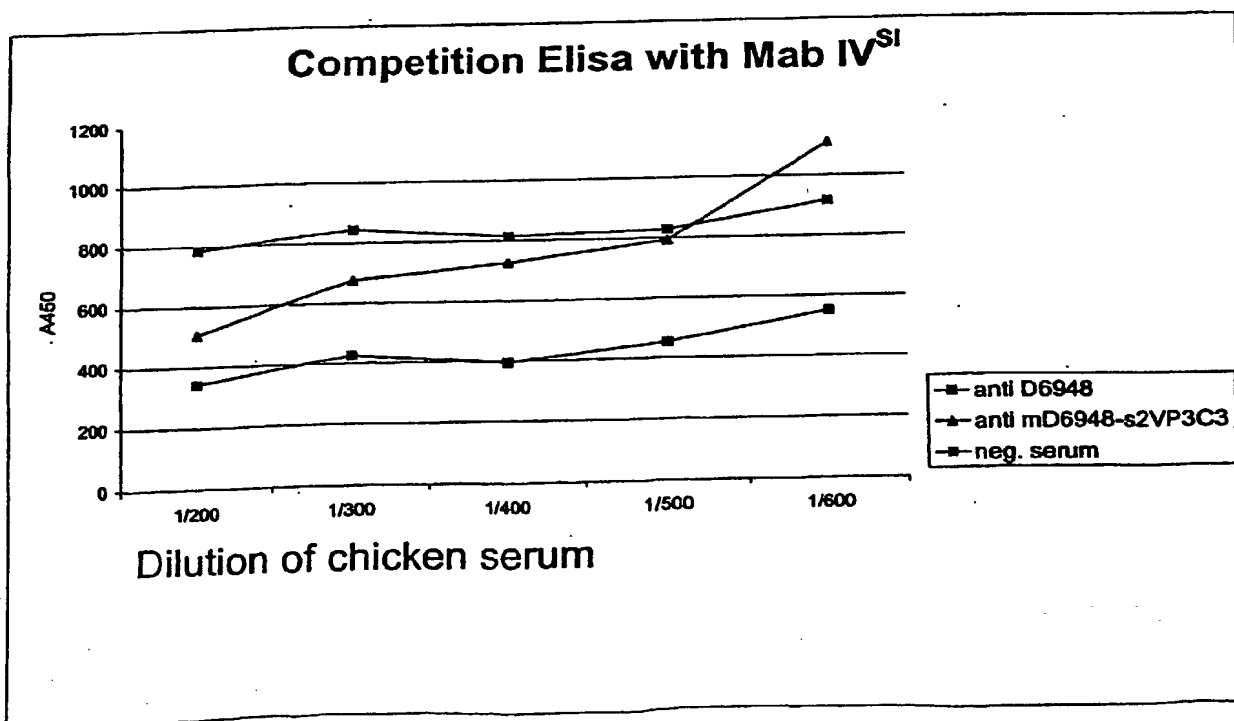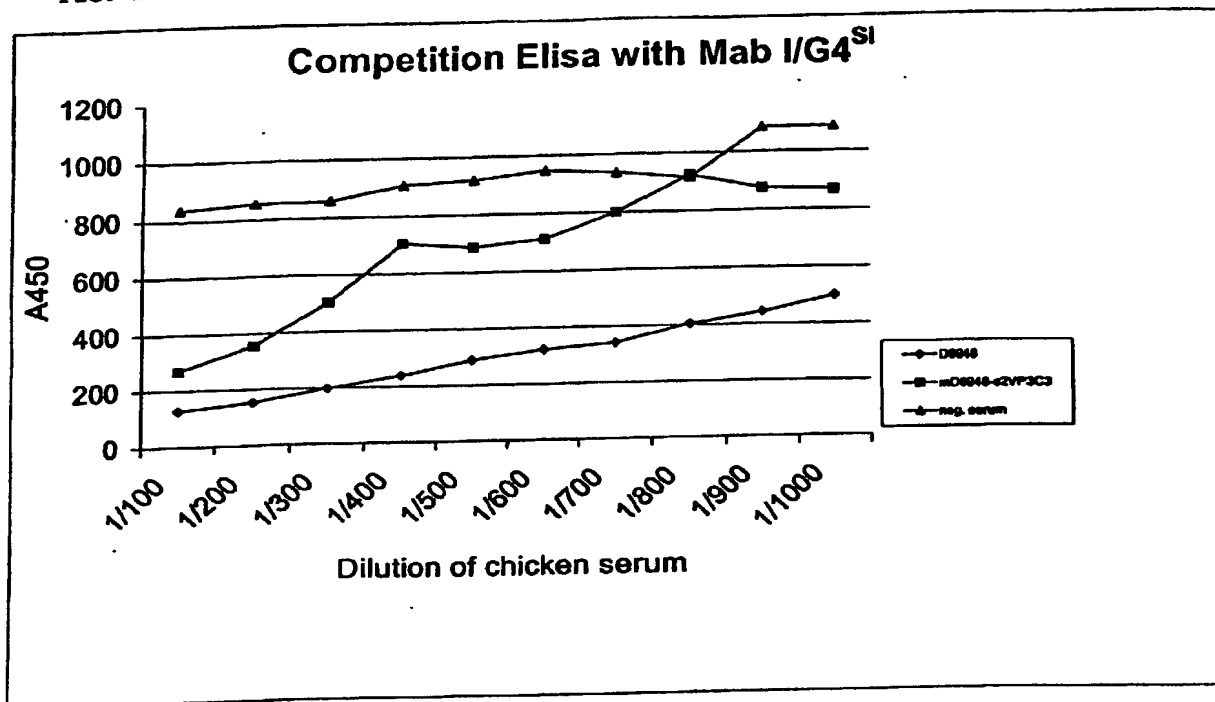
TITLE: MOSAIC INFECTIOUS BURSAL
DISEASE VIRUS VACCINES
Inventor: Boot et al.
Serial No.: 10/046,671
Docket No.: 2183-5238US

30/38

Fig. 16A

```
                                                                                                    75
                                                                                                    71
D6948-VP5   MLSLMVSRDQ TNDRSDDEPA RSNPTDCSVH TEPSDANRRT GVHSGRHPRE AHSQVRDLDL QFDCGGHRVR ANCLF
CEF94-VP5   ----                                 K                            G

                                                                                                    149
                                                                                                    145
            PMPPMLNCGC SLHTABQWEL QVRSDAPDCP EPTGQLQLLQ ASESESESEV KRTPWWRLCT KMEHKRRDLP RKPE
                I                                              S        R
```

TITLE: MOSAIC INFECTIOUS BURSAL
DISEASE VIRUS VACCINES
Inventor: Boot et al.
Serial No.: 10/046,671
Docket No.: 2183-5238US

31/38

Fig. 16B

D6948-PP
CEF94-PP

```
MTNLQDQTQQ IVPFIRSLLM PTTGPASIPD DTLEKHTLRS ETSTYNLTVG DTGSGLIVFF PGFPGSIVGA HYTLQ   75

SNGNYKFDQM LLTAQNLPAS YNYCRLVSRS LTVRSSTLPG GVYALNGTIN AVTFQGSLSE LTDVSYNGLM SATAN   150

INDKIGNVLV QBGVTVLSLP TSYDLGYVRL GDPIPAIGLD PKMVATCDSS DRPRVYTITA ADDYQPSSQY QAGGV   225
                                                                               P

TITLFSANID AITSLSIGGE LVFQTSVQGL ILGATIYLIG FDGTAVITRA VAADNGLTAG TDNLMPFNIV IPTSE   300
                V H V                                    N T     L L       N

ITQPITSIKL EIVTSKSGGQ AGDQMSWSAS GSLAVTIHGG NYPGALRPVT LVAYERVATG SVVTVAGVSN FELIP   375
                         R

NPELAKNLVT EYGRFDPGAM NYTKLILSER DRLGIKTVWP TREYTDFREY FMEVADLNSP LKIAGAFGFK DIIRA   450

LRRIAVPVVS TLFPPAAPIA HAIGEGVDYL LGDEAQAASG TARAASGKAR AASGRIROIT LAADKGYEVV ANLFQ   525
I

VPONPVVDGI LASPGILRGA HNLDCVLREG ATLFVVITT VEDAMTPKAL NBKMFAVIEG VREDLQPPSO RGSFI    600
          V

RTLSGHRVYG YAPDGVLPLE TGRDYTVVPI DDVWDDSIML SKDPIPPIVG NBGNHAIAYM DVFRPKVPIH VAMTG   675

ALNAYGRIEN VSTRSTKLAT ARRLGLKLAG PGAFDVNTGS NWATFIKRFP ENPRDWDRLP YLNLPYLPPN AGRQY   750
                C K                                   P

DLAMAASEFK ETPELESAVR AMEAAANVDP LFQSALSVFM WLEENGIVTD MANFALSDPN AHRMRNTLAN APQAG   825
H

SKSQRAKYGT AGYGVEARGP TPEEAQREKD TRISKKMETM GIYFATPEWV ALNGHRQPSP GQLKYWQNTR EIPDP   900

NEDYLDYVHA EKSRLASEEQ ILRAATSIYG APGQABPPQA FIDEVAKVYE INHGRGPNQE QMRDLLITAM EMKHR   975

NPRRAPPKPK PKPNAPTQRP PGRLGRWIRA VSDEDLE                                            1012
          L                              T
```

TITLE: MOSAIC INFECTIOUS BURSAL
DISEASE VIRUS VACCINES
Inventor: Boot et al.
Serial No.: 10/046,671
Docket No.: 2183-5238US

32/38

Fig. 16C

```
D6948-VP1  MSDVFNSPQA RSKISAAFGI KPTAGQDVEE LLIPKVVFPP EDPLASPSRL AKFLRENGYK ILQPRSLPEN EEYET   75
CBF94-VP1           I          T                                           V

           DQILPDLAWM RQIEGAVLKP TLSLPIGDQE YFPKYYPTHR PSKEKPNAYP PDIALLKQMI YLPLQVPEAT DNLKD  150
                                                                                       N EQ

           EVTLLTQNIR DKAYGSGTYM GQATRLVAMK EVATGRNPNK DPLKLGYTFE SIAQLLDITL PVGPPGEDDK PWVPL  225

           TRVPSRMLVL TGDVDGEFEV EDYLPKINLK SSSGLPYVGR TKGETIGEMI AISNQFLREL SALLKQGAGT KGSNK  300
                                 D                                              T

           KKLLSMLSDY WYLSCGLLFP KAERYDKSTW LTKTRNIWSA PSPTHLMISM ITWPVMSNSP NNVLNIESCP SLYKF  375

           NPPRGGLNRI VEWIMAPDEP KALVYADNIY IVHSNTWYSI DLEKGEANCT RQHMQAAMYY ILTRGWSDNG DPMFN  450

           QTWATTAMNI APALVVDSSC LIMNLQIKTY GQGSGNAATF INNHLLSTLV LDQWNLMKQP SPDSEEFKSI EDKLG  525
                          L B                           R      R

           INFKIERSID DIRGKLRQLV PLAQPGYLSG GVEPEQPSPT VELDLLGWSA TYSKDLGIYV PVLDKERLFC SAAYP  600
                                            B

           KGVENKSLKS KVGIBQAYKV VRYEALRLVG GWNYPLLNKA CKNNASAARR HLEAKGPFLD EFLAEWSELS EFGEA  675
                                                                 G

           PEGFNIKLTV TPESLAELMR PVPPKPPNVN RPVNTGGLKA VENALKTGRY RNEAGLSGLV LLATARSRLQ DAVKA  750
                      B        K

           KARABKLHKS KPDDPDADMF ERSETLSDLL EKADIASKVA HSALVETSDA LEAVQSTSVY TPKYPEVTNP QTASN  825

           PVVGLHLPAK RATGVQAALL GAGTSRPMGM EAPTRSKNAV KMAKRQRQK ESRQ--                          879
                                                              QP                             881
```

TITLE: MOSAIC INFECTIOUS BURSAL
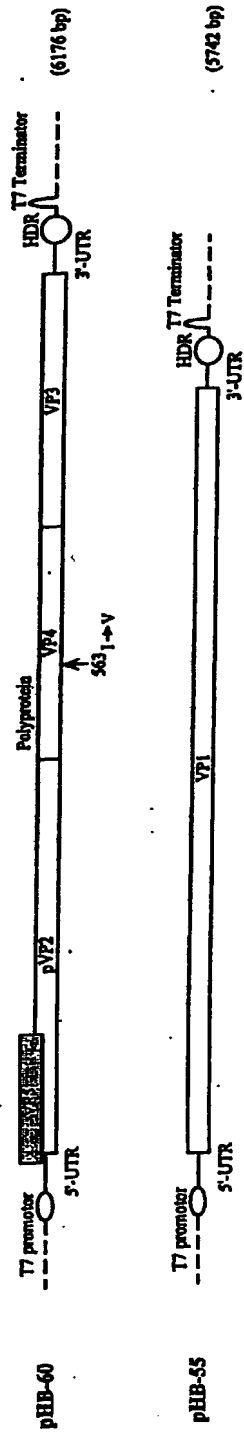DISEASE VIRUS VACCINES
Inventor: Boot et al.
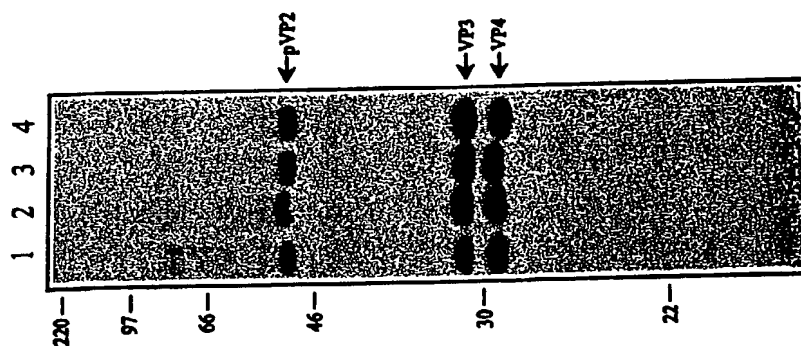Serial No.: 10/046,671
Docket No.: 2183-5238US

33/38

Fig. 17

TITLE: MOSAIC INFECTIOUS BURSAL
DISEASE VIRUS VACCINES
Inventor: Boot et al.
Serial No.: 10/046,671
Docket No.: 2183-5238US

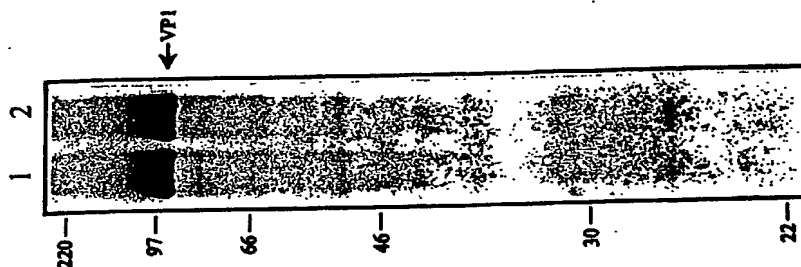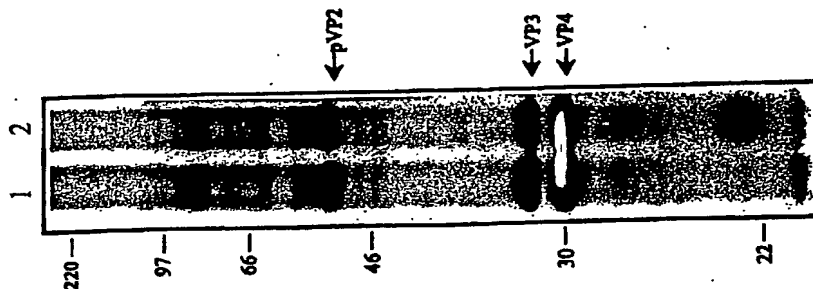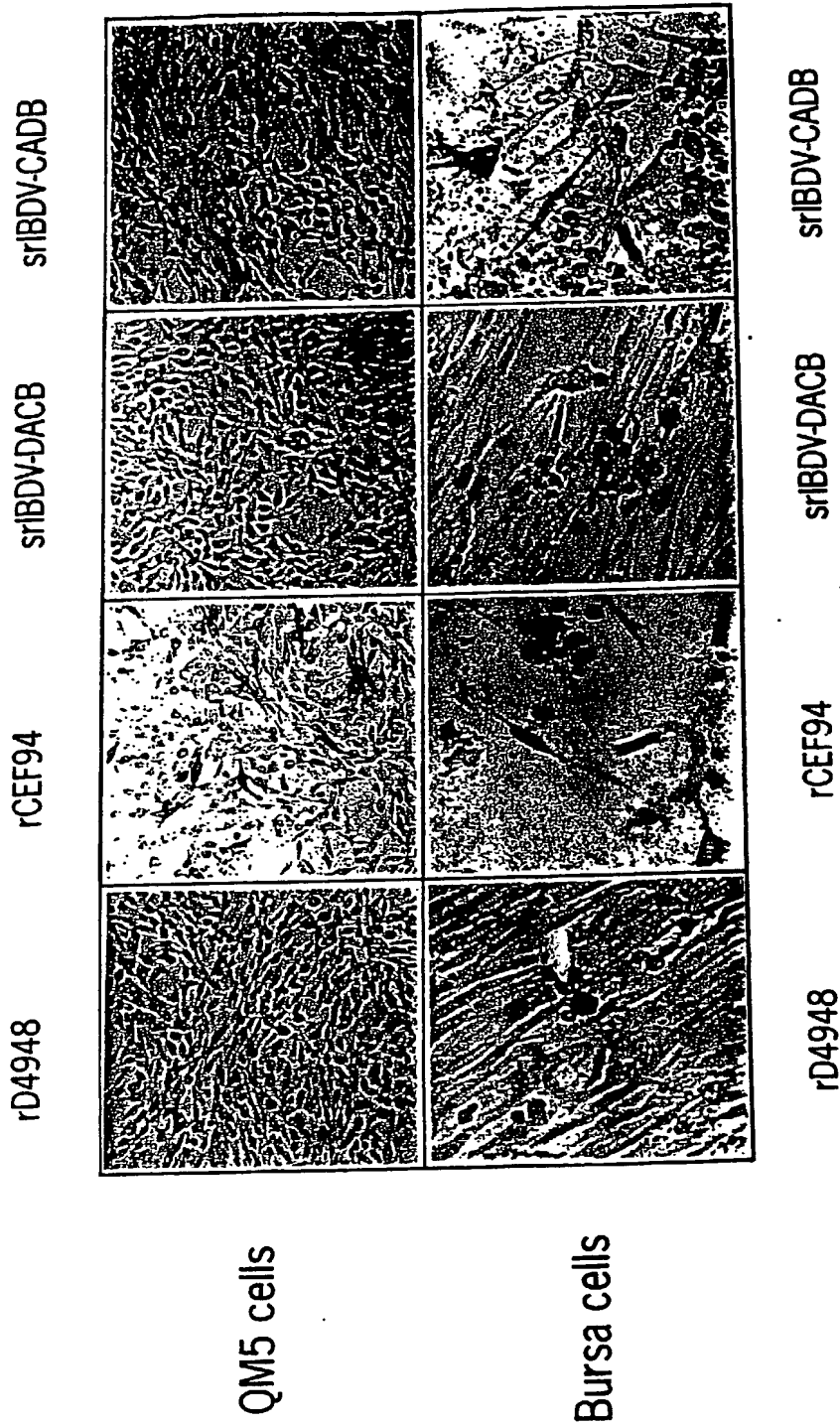34/38

Fig. 18c

Fig 18b

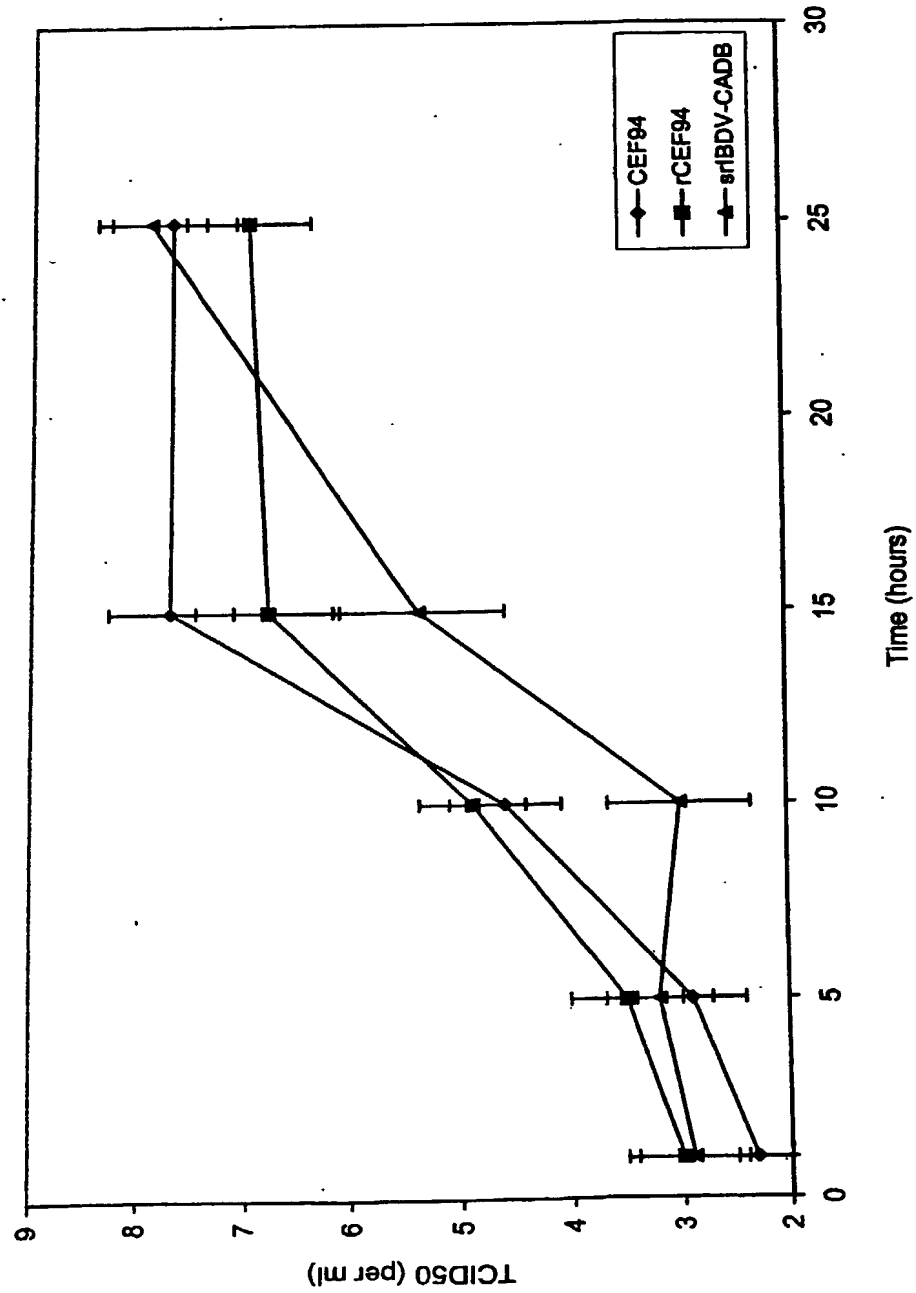Fig. 18a

TITLE: MOSAIC INFECTIOUS BURSAL
DISEASE VIRUS VACCINES
Inventor: Boot et al.
Serial No.: 10/046,671
Docket No.: 2183-5238US

35/38

Fig. 19

TITLE: MOSAIC INFECTIOUS BURSAL
DISEASE VIRUS VACCINES
Inventor: Boot et al.
Serial No.: 10/046,671
Docket No.: 2183-5238US

36/38

Fig. 20

TITLE: MOSAIC INFECTIOUS BURSAL
DISEASE VIRUS VACCINES
Inventor: Boot et al.
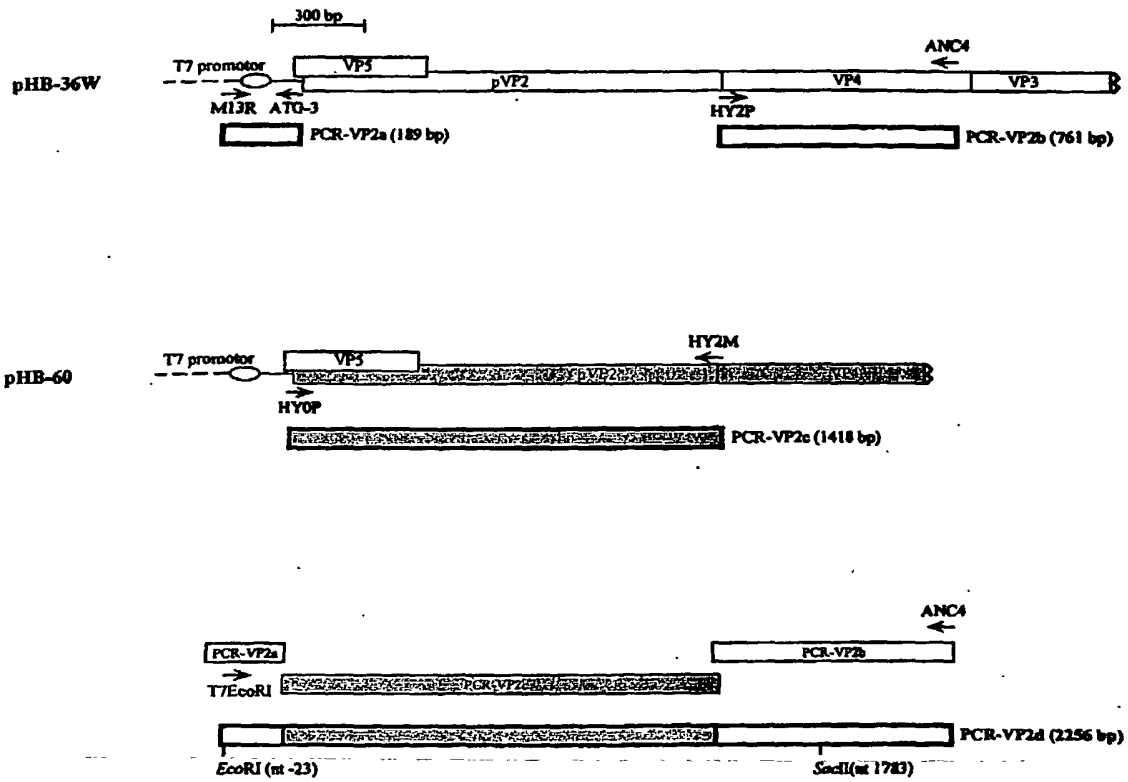Serial No.: 10/046,671
Docket No.: 2183-5238US

37/38

Fig. 21

TITLE: MOSAIC INFECTIOUS BURSAL
DISEASE VIRUS VACCINES
Inventor: Boot et al.
Serial No.: 10/046,671
Docket No.: 2183-5238US

38/38

Fig. 22